

Instruction Manual

FOR

ASSEMBLY AND OPERATION

NO. 7 TELEKIT



DESIGNED BY

TELEVISION TRAINING INSTITUTE

FOR

ELECTRO-TECHNICAL INDUSTRIES

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BEFORE TURNING ON THE SET BE SURE THAT THE SOUND VOLUME CONTROL IS TURNED COUNTER CLOCKWISE AS FAR AS IT WILL GO.

TURN ON OFF BRIGHTNESS CONTROL CLOCKWISE UNTIL THE SWITCH CLICKS. SET IS NOW ON. ALLOW A FEW MINUTES FOR THE SET TO WARM UP.

TURN BRIGHTNESS CONTROL COUNTER CLOCKWISE UNTIL SCREEN IS FILLED WITH LIGHT; THEN COUNTER CLOCKWISE UNTIL LIGHT GOES OUT.

TURN THE CONTRAST CONTROL CLOCKWISE UNTIL THE PICTURE APPEARS ON THE SCREEN. IF NO PICTURE APPEARS ROTATE THE FINE TUNING CONTROL UNTIL A PICTURE APPEARS.

WHEN PICTURE APPEARS, ADJUST THE BRIGHTNESS AND ALSO THE CONTRAST CONTROLS UNTIL A GOOD PICTURE RESULTS. THE CONTROLS IN THE BACK DO NOT NEED ANY ADJUSTMENT.

DON'T PUT YOUR HANDS INSIDE THE SET AS THERE IS HIGH VOLTAGE IN DE.

THE HIGH VOLTAGE IS 2000 VOLTS

INSTRUCTIONS FOR BUILDING 7 INCH TELEVISION RECEIVER

General:

The instructions provided are progressive and straight forward. They have been arranged in simplified form so that even the layman or inexperienced person may properly assemble a workable unit. It is necessary however, that to properly assemble this unit that construction and other details as outlined should be followed with care and discretion. Also, techniques other than given here should be avoided if it is desired to have a workable unit upon completion. Therefore, it is suggested that the construction details be followed as prescribed.

Soldering:

Before attempting to solder, be sure that soldering iron tip is clean and tinned. Also, that iron has reached the temperature that will permit heating joint and allow the solder to melt, flow fluidly over the joint. Care should be exercised in soldering all joints that flux is burned out. Use only a rosin flux with lead and tin (approximately half and half) as the solder. Be sure to scrape all leads and sand all points of grounds to insure good mechanical and electrical connections.

Placement of Parts: (Condensers and resistors)

It is very important that all parts such as condensers, resistors, sockets and transformers be placed in position as indicated in respective drawing and illustration figures. This is necessary because of the high frequencies employed and also the need for as short direct wiring to avoid interaction of other circuits. Full consideration has been given to a series of laboratory tested models and the suggestions given here are results of these tests.

Purpose of the Packets and Packages

The component parts have been arranged in small packets and packages and the assembly should be followed exactly as outlined in the instructions. This is necessary to avoid possible error and as well facilitates construction. Also, heavy and bulky units are held until the last of the job which makes for handling of the chassis a lighter task.

FINAL SUGGESTIONS PRIOR TO ACTUAL ASSEMBLY

1. Checking Packets

Remove the packets from the kit and arrange them in numerical sequence for easy checking. There should be a total of 24 packets.

2. Checking Packages

Remove the packages from the kit and check the package numbers. There should be a total of three packages.

3. 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)

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4. 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.

5. Care in Selection of Proper Parts

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

6. 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.

7. 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.

8. 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 very vigorously clean 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. Take the wire which is to be grounded and press it down on the tinned spot. 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.

9. 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:

10. 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

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is completed, mark off the paragraph and proceed to next step. Take your time and check very carefully each step.

11. 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 just lay wire on clean tip of soldering iron and apply a small amount of solder to wire.

12. Hardware

All the necessary nuts, washers and self-tapping screws will be found in the kit. The self-tapping screws for mounting the transformers and choke will be found in packet #70. Nuts and washers for mounting the controls will be found on their respective control shafts. The only washers required for control mounting are the four insulating fibre washers found on controls contained in Packet #42. 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:

13. 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 and medium sized holes have been numbered. All large holes (for sockets, can condensers, and cables) have been lettered alphabetically. These numbers and letters will be constantly referred to throughout the instructions. Socket lug designations have also been provided giving both top and bottom views 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),

14. 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.

OPERATION #1.

1. The first job to be undertaken will be the mounting of all sockets in the chassis and the wiring of the heater circuits and ground connections. First refer to sheet #2 (socket layout, heater and ground sheet) and study carefully. This view is an underside chassis view. Be sure to note the positions of the socket keys. Now from your kit select Packet Nos. 1, 2, 3, 4, 5, and 72. Packet #2 contains 12 octal 8 prong phenolic sockets. These are designated as Sockets A, C, D, F, G, H, I, J, K, N, O, S, on master sheet. Open Packet #1 and select 12 socket rings. Replace unused rings in Packet #1.
2. Place one socket into opening A and rotate until key is in position indicated in Fig. #2. Place ring over socket (underside) and force down over flange until the ring engages slot around socket. A small screw driver will assist

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in this operation. When ring slips into slot it will secure socket snugly in socket hole. Be sure ring is entirely in slot all around. Follow this same procedure with sockets C, D, etc.

3. Select packet #3 and remove white ceramic octal socket. Place in hole "L" with proper key position and follow above procedure in mounting with socket ring.
4. Select packet #4 and remove four prong socket. Place in hole "V" with proper key position and mount with socket ring.
5. Select Packet #72 and remove loktal socket. Place in hole "E" with the proper key position and mount with socket ring.
6. Select packet #5 and remove 7 pin miniature socket. This socket also contains two small self-tapping screws for mounting. Place in socket hole "Q" with proper key position and drive self-tapping screws in holes 33 and 34. Note that the mounting flange must be placed on the top side of the chassis and the mounting of this socket proceeds from the top side of the chassis.
7. 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. Select packet #69 and remove solder. Do not cut solder at any time. Wrap solder into a loose hank with the end which is to be applied to the joint protruding about 3 inches. This is a convenient method of handling solder. Before tinning spot, clean with emery cloth. The spot should include the socket ring so it will be necessary to clean that part of the ring which falls in spot. 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 spot. The object of tinning these spots is to secure the ring to the chassis and to form a foundation for ground connections. Omit spot for the present around socket "Q".
8. After all spots are made and checked for quality (try to lift with screwdriver tip). Select packet #7 and remove bare ground wire. Wrap into loose hank and proceed to thread end of wire through top hole of lug #4 on socket "Q". Thread wire up through hole from bottom. Take end of wire to metal key post of socket "Q" and solder securely to top of post. Press wire to chassis at base of Lug #4 and solder wire directly to chassis (as per note "Chassis Connections"). Finally solder Lug #4 where wire passes through hole. Snip hank of wire off at point where chassis joint was made. Proceed to Socket "L". Thread wire through top holes of Lug Nos. 1, 2, 3, 5. From Lug #5 take wire to chassis spot previously prepared. Solder this end to spot. Solder wire to spot at base of Lug #1. Solder wire into holes of Lugs #1, 2, 3 and 5. Snip hank off at ground connection. Proceed to following sockets and following the above procedure make these ground connections. Refer to Fig. #2 to check work.

SOCKET

GROUNDED LUGS

K	1,2,3
B	1, Center Post, 4
A	1,2
C	1,2,3
J	1,2,3
D	1,2,3
F	8,3,6
G	8,3,6
H	8
I	8
O	8,3,6
N	8

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Be sure to check all ground connections for rigidity 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 shorted circuits would be the result. Replace unused ground wire back into packet #7.

9. After completion of this project you are now ready to install the heater circuit. Select packet #6 and remove hank of heater wire. Push back insulation at end of wire and tin end. Proceed to socket "Q" and crimp tin end of wire to Lug #3 through top hole. Solder. After this connection is made, proceed to socket "L". Gauge the length of wire necessary to reach Lug #7 of this socket from the previous connection. Allow enough length to make a crimp and also to allow for pushing wire against chassis. All heater wires must "hug" chassis. Snip the hank off the wire at the proper point. Push back wire insulation and tin end. Crimp end of wire into Lug #7 but do not solder yet. Gauge another length of wire which will reach from Lug #7 of socket "L" to Lug #7 of socket "J". Tin ends and crimp into these two lugs. Solder the entire joint on socket "L", but do not solder Lug on socket "J". Run branches from #7 of socket "J" to both #7 on socket "X" and #7 of socket "I". Solder entire joint of socket "J". The following procedure will complete the filament circuit.

<u>FROM</u>	<u>TO</u>
#7 of socket "I"	#7 of socket "N"
#7 of socket "N"	#7 of socket "O"
#7 of socket "O"	#7 of socket "H"
#7 of socket "H"	#7 of socket "G"
#7 of socket "G"	#7 of socket "F"
#7 of socket "F"	#8 of socket "B"
#8 of socket "B"	#7 of socket "A"
#7 of socket "A"	#7 of socket "C"
#7 of socket "C"	#7 of socket "D"

Be sure to push all heater wires down close to chassis and double check with heater connections shown in Figure #2.

OPERATION #2

1. Operation #2 shall consist of the wiring of sockets "O" and "H".
2. Select packet #41 and remove one control. Remove nut from shaft and slide shaft through hole #11 on rear apron of chassis. The three soldering lugs should be "Up", that is, facing you. Replace nut on threaded portion of shaft and run down until control is snugly mounted to chassis. Tighten control nut with slip-joint pliers. Replace the two other controls back in packet. Looking at the control from the back, the three soldering lugs are designated as follows:

Lug on left is Low
 Lug on right is High
 Lug on center is Center

Select packet #7 and remove ground wire. With wire ground Low lug to metal case of control. Solder. Be sure to scrape metal before soldering. Check work with Figure #3.

3. Select packet #40 and remove control from bag. Following the above procedure, mount control in hole #12. Ground low lug to case. Solder. Refer to Figure #3.
4. Select packet #11 and remove one resistor. This is designated as resistor "a". Scrape leads. Lay resistor on socket "H" from lug #1 to ground spot. Gauge

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lead length and snip off excess. Thread lead of resistor through top hole of lug #1. Solder other lead to ground spot. Solder ground connection but not lug #1. Replace resistors in packet #11.

- ✓ 5. Select packet #28 and remove one trimmer condenser. This is designated as condenser "b". Place one lug of trimmer condenser directly on lug #1 of socket "H". Solder entire joint on lug #1.
- ✓ 6. Select packets #34 and #20. Remove one unit from each packet and replace excess back into packets. These are designated as condenser "c" and resistor "d". Stand condenser "c" beside socket "H" running parallel to rear apron. Thread one lead into top hole of lug #2. Snip and crimp. Thread other lead into lug #4 of socket. Connect one lead of resistor "d" into top hole of lug #2. Allow about 1/2 inch of lead. Snip and crimp. Solder entire connection on lug #2. Refer to Figure #3.
- ✓ 7. Select packet #38 and remove one unit from bag. This is designated as condenser "e" on figure #3. Stand condenser directly behind condenser "c". Twist one lead of condenser "e" to disconnected end of resistor "d" and solder this connection. Take other lead of condenser "e" to ground and solder.
- ✓ 8. Select packet #9 and remove one unit from bag. This is designated as resistor "f". Place resistor "f" on opposite side of socket from the condensers and ground one lead of resistor. Run the other lead of resistor "f" through lug #6 to lug #3 of socket "H". Crimp into top hole of lug #3 and solder. Solder lug #6 where wire runs through hole.
- ✓ 9. Select packet #74 and remove hook-up wire. Push back insulation at end of wire and tin end. Thread end of wire into lug #4 and crimp. Solder entire lug #4. Push wire down on chassis and run along chassis until the control at hole 12 is reached. Bring wire up to center lug and snip. Push back insulation, tin and crimp into center lug. Solder lug. Replace wire back into packet #74.
- ✓ 10. Select packets #33, 34 and 23. Remove unit from packet #33, one unit from #34 and one unit from #23. These are designated as condensers "g" and "h" and resistor "i" in Figure #3. Thread one lead of each condenser into lug #5 and crimp. Also, place one lead of resistor "i" into lug #5 of socket "H", crimp and solder entire lug #5. Ground other lead of condenser "g" to spot and connect other lead of condenser "h" to lug #1 of socket "O". Take other lead of resistor "i" to center lug of control mounted in hole #11. Solder center lug of control. Do not solder lug #1 of socket "O" yet. You have now completed wiring of socket "H".
- ✓ 11. Select packet #22 and remove one unit from bag. This is designated as resistor "j". Connect one lead of resistor "j" to the junction of condenser "e" and resistor "d". Solder and lay in position as indicated in figure #3.
- ✓ 12. Select packet #74 and remove hook-up wire. Tin end and connect to high lug on control in hole #11. Push down on chassis and run wire over to other lead of resistor "j". Snip, tin and solder wire to lead of resistor "j".
- ✓ 13. Select packet #57 and remove terminal strip. Solder mounting lugs of strip directly to ground spots on sockets "O" and "N". Use plenty of heat.
- ✓ 14. Select packet #24 and remove one unit. This is designated as resistor "k". Thread one end of resistor "k" into lug #1 of socket "O" and crimp. Solder entire lug #1. Ground other lead of resistor "k" to spot.

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- ✓ 15. Select packets #20 and #36. Remove one unit from each. These units are designated as resistor "1" and condenser "m". Stand condenser "m" on base and slip lug of condenser into soldering lug #1 of terminal strip. Select packet #74 and remove hook-up wire. Tin and insert end into lug #1 of terminal strip. Solder lug #1 of terminal strip. Take other end of hook-up wire to lug #2 of socket "0". Snip, tin and crimp into lug #2. Take resistor "1" and crimp one lead into lug #2. Solder entire lug #2. Leave other lead of resistor "1" open for the present.
- ✓ 16. Select packets #34, 24, and 13. Remove one unit from each. These are designated as condenser "n", resistor "o", and resistor "p". Thread lead of resistor "o" in lug #4 of socket "0" and crimp. Thread lead of condenser "n" in lug #4 and crimp. Solder entire lug #4. Ground other lead of resistor "o". Solder the open lead of resistor "1" to the other lead of condenser "n". Connect one lead of resistor "p" to the junction of "1" and "n". Solder entire connection. Take other lead of resistor "p" to the junction of resistor "j" and previously connected hook-up wire. Solder to this point.
- ✓ 17. Select packets #36 and #20. Remove one unit from each. These are designated as condenser "o" and resistor "r". Slip lug of condenser "o" into lug #2 of terminal strip. Select packet #74 and remove hook-up wire. Connect #2 of terminal strip to lug #5 of socket "0" with hook-up wire. Solder lug #2 of terminal strip. Connect one lead of resistor "r" to lug #5 of socket "0". Solder entire lug #5. Take other lead of resistor "r" and bring to junction point of resistors "j" and "p". Solder lead to this junction point. This is known as B+ junction #1.
- ✓ 18. You have now completed the wiring of two complete tubes. The clarified procedure which was given up to this point was designed to govern your every move. The experience gained in wiring and soldering should help you work much more efficiently and neatly with less detailed instructions. The next operation will be in condensed form but should be easy to follow. The diagram should be consulted at all times in the assembly of the kit.

OPERATION #3

- ✓ 1. Operation #3 should consist of the wiring of sockets "I" and "N". Select packet #41 and remove the two potentiometers. Mount in holes 10 and 9. Ground center lug of control in hole 10 to case. Ground low lug of control in hole 9. Fasten nuts securely.
- ✓ 2. Select packet #25. Remove two resistors. These are resistor "a" and resistor "b" in diagram #4. Hold resistors side by side and twist one lead of each unit together. Solder this junction but do not cut. Connect junction to open end of trimmer "b" on Figure #3. Solder. Ground other lead of resistor "a". Connect other lead of resistor "b" to lug #1 of socket "I". Solder.
- ✓ 3. Select packets #38, 20, 21. Remove two condensers from packet #38. These are condensers "c" and "d". Connect condenser "c" from lug #2 to lug #4 of socket "I". Mount condenser "d" beside condenser "c" and ground one lead. Leave the other lead open for the present. From packet #20 withdraw one resistor. This is resistor "e". Connect one lead of resistor "e" to lug #2 of socket "I". Solder entire lug #2. The other lead of resistor is connected to open lead of condenser "d". From packet #21 remove one resistor. This is designated as resistor "f". Connect between junction of condenser "d" and resistor "e" and B+ junction #1. Refer to Figure #4.
- ✓ 4. Select packet #9. Remove resistor "g". Thread one lead of resistor through lug #6 and crimp to lug #3. Solder both lugs. Ground other end of resistor "g".

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- ✓ 5. Select packet #7¹ and remove hook-up wire. Tin end and connect to high lug of control in hole #10. Solder. Run wire along chassis to lug #4 of socket "I". Connect to lug #4 and solder.
- ✓ 6. Select packets #24, 38 and 39. From packet #39 remove the condenser. This is condenser "h". Ground one lead of this condenser. Connect other lead to lug #5 of socket "I". Crimp but do not solder. From packet #38 remove one condenser. This is condenser "i". Connect one lead of condenser "i" to #5 of socket "I" and crimp. With hook-up wire, connect other lead of condenser to high lug of control in hole #9. Remove resistor "j" from packet #24. Insert one lead into lug #5 of socket "I" and crimp. Solder entire lug #5. Connect other lead of resistor "j" to B+ junction point #1. This completes wiring of socket "I".
- ✓ 7. With hook-up wire, connect #1 lug of socket "N" to center lug of control in hole #9. Push wire down on chassis.
- ✓ 8. Select packets #36, 38, 22, and 25. Remove condenser "k" from packet #36. Slide lug of condenser into lug #3 of terminal strip. With hook-up wire, connect this lug to lug #2 of socket "N". Solder lug #3 of terminal strip. Remove condenser "l" from packet #38. Crimp one lead of condenser into lug #2 of socket "N". Remove resistor "m" from packet #25. Twist one lead of resistor "m" to open lead of condenser "l". Solder this connection and snip off excess. Crimp other lead of resistor "m" into lug #4 of socket "N". Remove resistor "n" from packet #22. Connect between lug #2 of socket "N" and B+ junction point. Solder entire joint on lug #2 of socket "N".
- ✓ 9. Select packet #15. Remove resistor "o" and thread one lead of resistor "o" thru lug #6 and crimp to lug #3 of socket "N". Ground the other lead of this resistor. Solder up both lug #3 and lug #6.
- ✓ 10. Select packet #20. Remove resistor "p" and crimp one lead into lug #4. Ground the other lead of resistor "p". Solder up entire lug #4.
- ✓ 11. Select packets #36 and 22. Remove condenser "a" from packet #36 and slide into lug #4 of terminal strip. With hook-up wire, connect lug #4 of terminal strip to lug #5 of socket "N". Crimp into lug #5 but do not solder yet. Remove resistor "r" from packet #22. Crimp one lead of this resistor into lug #5 of socket "N" and connect other lead to B+ junction point #1. Solder entire lug #5. This completes wiring of sockets "I" and "N".

OPERATION #4

- ✓ 1. Operation #4 shall consist of the wiring of sockets "F" and "G" and holes "Σ", "21" and "22". Select packet #48 and withdraw can condenser. Insert condenser into hole "E" from topside of chassis with lugs entering hole first. The mounting method will be as follows: With a screw driver, bend the mounting lugs (the ones connected to the can) back until they are flat against chassis. Mark the outline of each with pencil on chassis. Rotate can until all outlines are exposed. Scrape chassis at these points and solder ground spots to chassis. Rotate can again until mounting lugs coincide with spots. Solder lugs directly to spots. Use plenty of heat. Refer to Figure #5.
- ✓ 2. Select packet #54 and packet #71. Withdraw coil from packet #54. This is coil "a". Note that the four wires from the coil form are color coded as follows: Red, blue, green and white. Remove both nuts from coil form. Mount coil form in hole #21 with the coil form facing you on underside of chassis. Place large holed nut on threaded portion of coil form and run down on topside of chassis. Secure nut with slip joint pliers. Replace and run down small holed nut until finger tight. Take green wire of coil and run it to lugs #1 and #2 of socket "F". Gauge the length necessary to make this joint. Do not cut yet. Take a small piece of sandpaper and

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fold it around wire. Scrape paper rapidly along wire's length until insulation is gone. Be careful not to break wire. After wire is bright, make cut. From packet #71 remove spaghetti insulation. Gauge a length necessary to reach from coil to lug. Snip and slide spaghetti on wire. Thread wire through lug #1 and crimp into lug #2. Solder both lugs. Leave other leads of coil open for the present. Replace spaghetti into packet. Refer to Figure #5.

- ✓3. Select packets #11 and 58. Remove resistor "b" from packet #11. Crimp one lead of resistor into lug #4 of socket "F". Ground other lead of resistor "b". Remove coil "c" from packet #58. Crimp one lead of coil into lug #4 of socket "F". Solder up lug #4. Connect other lead of coil "c" to white lead of coil "a". Prepare white lead in same manner as previously prescribed using spaghetti. Solder this joint.
- ✓4. Select packets #12, 16, 17, 34 and 38. Remove condenser "d" from packet #34 and remove resistor "e" from packet #17. Place side by side and twist one lead of each unit together. Solder this joint. Crimp other lead of resistor "e" into lug #5 of socket "F". Crimp other lead of condenser "d" into lug #1 of socket "G". Remove condenser "f" from packet #38. Crimp one lead of condenser "f" into lug #5 of socket "F". Crimp other lead of condenser "f" into lug #4 of socket "G". Remove resistor "g" from packet #12 and resistor "h" from packet #16. Take hook-up wire from packet #74 and tin end. Twist one lead of resistor "g" to one lead of resistor "h". At this junction point connect hook-up wire. Crimp other lead of resistor "g" into lug #5 of socket "F". Solder entire lug #5. The other lead of resistor "h" will be left open at this point and will form the basis for another main junction point. Run hook-up wire to any tie lug on can condenser which was previously mounted in hole "E". Any one of the four tie lugs on center of condenser can be used. This completes wiring of socket "F".
- ✓5. Select packet #24 and remove resistor "i". Crimp one lead of resistor "i" into lug #1 of socket "G". Solder lug #1. Ground other lead of resistor "i". Refer to Figure #5.
- ✓6. Select packets #17, 22 and 34. Remove resistor "j" from packet #17. Crimp one lead of resistor into lug #2. Ground other lead. Remove condenser "k" from packet #34. Crimp one lead into lug #2 of socket "G" and connect other lead to trimmer lug. (See Figure #5). Remove resistor "l" from packet #22. Crimp one lead of resistor "l" into lug #2. Solder entire lug #2. Take the other lead of resistor "l" to open lead of resistor "h" and twist. This is identified as B+ junction point #2.
- ✓7. Select packet #24 and withdraw resistor "m". Crimp one lead into lug #4 of socket "G". Ground other lead of resistor "m". Solder entire lug #4.
- ✓8. Select packets, #14, 59 and 65. Remove one lead from packet #65 and replace others back into bag. Skin ends of this lead and tin. Place prommet in hole #22. Run lead through hole #22 from topside of chassis and crimp into lug #5. Remove resistor "n" from packet #14 and coil "o" from packet #59. Twist one lead of each together and solder. Crimp other lead of resistor "n" into lug #5 of socket "G". Solder lug #5. Take other lead of coil "o" to B+ junction point #2 and twist. This comple. wiring of operation #4. Refer to Figure #5 and check.

OPERATION #5

- ✓1. Operation #5 shall consist of wiring sockets "D", "C" and "J", and holes #19, #17, and #4. Select packets #31 and #11. Remove resistor "a" from packet #11. Crimp one lead of resistor "a" into #4 lug of socket "D". Ground other lead of resistor "a". Remove condenser "b" from packet #31 and crimp into lug #4 of socket "D".

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Solder entire lug #4. Crimp other lead of condenser "b" into lug #8 of socket "C". Refer to Figure #6.

2. Select packets #8, 20 and 34. Remove condenser "c" and "d" from packet #34. Twist one lead of each condenser together and solder. Place in position as indicated in Figure #6. Crimp other lead of condenser "c" into lug #5 of socket "D". Crimp other lead of condenser "d" into lug #6. Remove resistor "e" from packet #8 and crimp one lead into lug #5. Ground other lead of resistor "e". Solder entire lug #5. Remove resistor "f" from packet #20. Crimp one lead into lug #6 of socket "D". Leave other lead open for present. Solder #6 lug. Refer to Figure #6.
3. Prepare blue lead of the large coil "a" of operation #4 and slip spaghetti on lead. Crimp lead into #8 lug of socket "D". Solder #8 lug. Refer to Figure #6.
4. Select packets #15 and 34. Remove condenser "g" from packet #34. Ground one lead of condenser "g". Leave other lead of condenser "g" open for present. Remove resistor "h" from packet #15. Connect one lead of resistor "h" to Et junction point #2. Now prepare the red lead of the large coil. Slip spaghetti over the wire and connect together the following wires: Open lead of resistor "f", open lead of condenser "g", open lead of resistor "h" and red lead of large coil. Twist this point and solder securely. This completes wiring of socket "D".
5. Select packets #53 and 71. Remove coil from packet. This is coil "i". Notice that only two leads are coming from coil. These are coded blue and red. Mount coil "i" in hole #19. Prepare blue lead and gauge spaghetti length. Crimp lead into #8 lug of socket "C" and solder. Replace spaghetti back in packet #71.
6. Select packets #15, 34 and 71. Remove condenser "j" from packet #34. Ground one lead of condenser "j". Remove resistor "k" from packet #15. Twist one lead of resistor "k" to Et junction point #2. Connect open lead of condenser "j" to open lead of resistor "k". Prepare red lead of coil "i" and use spaghetti from packet #71. Connect red lead of coil to point where "j" and "k" join. Solder this connection. Refer to Figure #6.
7. Select packets #11 and 31. Remove resistor "l" from packet #11. Crimp one lead of this resistor into lug #4 of socket "C". Ground other lead of resistor "l". Remove condenser "m" from packet #31. Crimp one lead into lug #4 of socket "C" and take the other lead over to lug #8 of socket "J". Crimp into lug #8. Solder lug #8. Refer to Figure #6.
8. Select packets #8, 20, 34 and 46. Remove condenser "n" and "o" from packet #34. Twist one lead of each condenser together. Solder. Ground this connection. Crimp other lead of condenser "n" to lug #5 of socket "C". Crimp other lead of condenser "o" into lug #6. Remove resistor "p" from packet #8. Crimp one lead of resistor "p" into lug #5 of socket "C". Take hook-up wire and tin end. Connect hook-up wire to open lead of resistor "p". Remove control from packet #46. With ground wire from packet #7, ground high lug of control to metal case. Mount control in hole #4 on front apron of chassis. Secure nut tightly with slip joint pliers. Connect previously connected hook-up wire to center lug of control. Solder center lug. Push hook-up wire down on chassis. From packet #20 remove resistor "q". Crimp one lead of resistor "q" into lug #6 of socket "C". Take other lead of resistor "q" to junction of red lead, condenser "j" and resistor "k". Solder this connection. Solder lug #6 also. This completes wiring of socket "C". Refer to Figure #6.
9. Select packet #52 and remove coil "r". This is coded: Red, blue, green and white leads are used on this coil. Mount coil "r" in hole #17. Prepare blue lead of coil and place spaghetti on lead. Connect lead to lug #8 of socket "J" and solder.

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Prepare green lead and crimp into lug #4 of socket "K". Prepare white lead and solder to chassis at the base of the coil form.

- ✓ 10. Select packets #15 and 34. Remove condenser "s" from packet #34 and ground one lead to chassis. Remove resistor "t" from packet #15 and twist one lead to B+ junction point #2. Solder entire B+ junction point #2. Connect other lead of resistor "t" to open lead of condenser "s". Prepare red lead of coil "r" and join to the junction of "s" and "t". Solder this connection.
- ✓ 11. Select packets #11 and 31. Remove resistor "u" from packet #11. Crimp one lead into lug #4 of socket "J". Ground other lead of resistor "u". Remove condenser "v" from packet #31. Crimp one lead into lug #4 of socket "J". Crimp other lead of condenser "v" into lug #8 of socket "L". Solder lug #4. Refer to Figure #6.
- ✓ 12. Select packets #8, 20 and 34. Remove condensers "w" and "x" from packet #34. Twist one lead of each condenser together and ground. Crimp lead of condenser "w" into lug #5 of socket "J". Crimp lead of condenser "x" into lug #6 of socket "J". Remove resistor "y" from packet #8 and crimp one lead into lug #5 of socket "J". Ground other lead of resistor "y". Solder lug #5. Remove resistor "z" from packet #20. Crimp one lead of lug #6 of socket "J". Solder entire lug #6 of socket "J". Connect other lead of resistor "z" to junction of red lead of coil "r", condenser "s" and resistor "t". This completes entire operation #5. Check with Figure #6.

OPERATION #6

- ✓ 1. Operation #6 shall consist of the wiring of sockets "K", "B", and "A", and holes #18, #5, and #20. Select packet #28 and remove trimmer condenser "a". Place trimmer in to gauge size between lug #4 of socket "K" and ground. Mark point on chassis where soldering lug of trimmer makes contact. Scrape chassis at that point and solder a chassis spot. Slip lug of trimmer over #4 lug of socket "K". Press other lug of trimmer against chassis spot and solder securely to spot. Remove resistor "u" from packet #21 and connect from #4 of socket "Z" to ground. Solder up lug #4. Refer to Figure #7.
- ✓ 2. Select packets #9, 34 and 20. Remove condenser "b" and "c" from packet #34. Twist one lead of each together and solder. Ground the twisted lead. Crimp lead of condenser "b" into lug #5 of socket "Z". Crimp lead of condenser "c" into lug #6 of socket "K". Remove resistor "d" from packet #9. Crimp one lead of resistor "d" into lug #5. Ground other lead of resistor "d". Remove resistor "e" from packet #20. Crimp one lead into #6 lug of socket "K". Leave other lead open for the present. Refer to Figure #7.
- ✓ 3. Select packet #50 and remove coil "f". Mount coil "f" into hole #18. Note that there are five leads on this coil. Two leads are soldered to trimmer lugs. These are code red, blue, green, yellow and white. Prepare blue lead and crimp into lug #8 of socket "K". Refer to Figure #7.
- ✓ 4. Select packets #15 and 34. Remove condenser "g" from packet #34. Ground one lead of condenser "g". Twist other lead of condenser "g" to open lead of resistor "e". Prepare red lead of coil "f" and twist to junction of "g" and "e". Remove resistor "h" from packet . Twist one lead of resistor "h" to this junction and leave other lead of resistor "h" open for the present. Solder entire junction. This completes wiring of socket "K". Solder up all lugs but lug #8. Refer to Figure #7.
- ✓ 5. Select packets #17, 21, 30 and 31. Remove condenser "i" from packet #31. Crimp one lead of condenser "i" into lug #7 of socket "B". Ground other lead of condenser "i". Remove condenser "j" from packet #30 and remove resistors "k" and "l".

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from packet #21. Take one lead of each of these three units and twist together. Fan units out to their respective joints in accordance with Figure #7. Crimp other lead of condenser "j" to lug #8 of socket "E". Solder lug #8. Ground other lead of resistor "k". Crimp other lead of resistor "l" into lug #7 of socket "E". Remove resistor "m" from packet #17. Crimp one lead of resistor "n" into lug #7 of socket "E". Leave other lead of resistor "m" open for the present. Solder lug #7. Prepare yellow lead of coil "f" and connect to junction of units "j", "k" and "l". Solder this junction.

- ✓ 6. Select packet #43 and remove one control. Ground low lug of this control with ground wire to metal case. Mount control in hole #5 and tighten nut with slip joint pliers.
- ✓ 7. Select packets #22 and 35. Remove condenser "n" from packet #35 and slip spaghetti on both leads. Crimp one lead of condenser "n" into high lug of control. Crimp other lead of condenser "n" into lug #2 of socket "E". Remove resistor "o" from packet #22 and crimp one lead into lug #2 of socket "E". Solder lug #2. Crimp other lead of resistor "o" into lug #4 of socket "A".
- ✓ 8. Select packets #27 and #35. Remove resistor "p" from packet #27. Crimp one lead of resistor "p" into lug #3 of socket "E". Ground other lead of resistor "p". Remove condenser "o" from packet #35. Crimp one lead of unit "o" into lug #3 of socket "E". Take other lead of condenser "o" to open lead of resistor "m" and twist. Solder this connection.
- ✓ 9. Notice trimmer mounted on top of coil "f". One lug is marked green and one lug is marked white. Remove ground wire from packet #7. Gauge a length necessary to wire the green lug of the trimmer to lug #5 of socket "E". Take spaghetti from packet #71 and cut a piece necessary to insulate wire. Clean green paint off trimmer lug and solder wire to this lug. Slip spaghetti on wire and crimp other end into lug #5. Solder lug #5. Hook white lug of trimmer to lug #6 in the same manner. This completes wiring of socket "E". See that all lugs are soldered. Check with Figure #7.
10. Select packet #74 and remove hook-up wire. Connect center lug of control to lug #5 of socket "A". Solder both lugs. With hook-up wire crimp into lug #8 of socket. Run wire over chassis to can condenser in hole "E". Solder to one center lug in hole "E".
- ✓ 11. Select packet #9 and withdraw resistor "r". Crimp one lead of resistor "r" into lug #3 of socket "A". Solder lug #8. Ground other lead of resistor "r".
- ✓ 12. Select packets #35, 60 and 73. Remove one rubber grommet from packet #73. Place in hole #20. Remove pair of leads from packet #60. Twist these leads together. Tin one end of each lead and run through grommet from topside of chassis. Crimp one lead into lug #3 and one lead into lug #4. Remove condenser "s" from packet #35. Solder one lead of condenser "s" into lug #3. Crimp other lead of condenser "s" into lug #4.
- ✓ 13. Select packet #10. Remove resistor "t" from packet #10. Crimp one lead to lug #4. Twist other lead of resistor "t" to open lead of resistor "h". Solder this connection. This junction is identified as B+ junction point #3. With hook-up wire connect lug #4 of socket "A" to an unused post in center of can condenser in hole "E". Be sure to solder all lugs and connections. Check work with Figure #7.

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OPERATION #7

- ✓ 1. This operation shall consist of the wiring of sockets "L", and "Q", and holes #14, #16, #33, #34, #2, and #3. Be very careful to keep all leads short in entire operation #7. Select packets #44 and #45. Remove tuner from packet #44. Mount tuner in hole #2 and secure tightly with nut. Remove switch from packet #45. Mount switch in hole #3 with soldering lugs down--that is--away from you. Remove bare wire from packet #7. Crimp one end of wire into lug on lower right side of tuner. Run wire up to lug on upper left side of switch. Solder both connections. Snip about four and one half inches of bare wire and crimp one lead into the fifth lug of the switch counting counter-clockwise from upper left hand corner. See Figure #8. Leave other end of lead open for the present.
- ✓ 2. Select packet #28 and remove the six remaining trimmer condensers. Solder six chassis spots in a line parallel with front apron of chassis. Refer to Figure #8. These spots are the points where the trimmers are to be mounted. Be sure to allow space for the trimmers to be mounted in an upright position side by side. Set the first trimmer condenser on the spot on the extreme left. Note that there are two lugs on each trimmer. The lug which is continuous with the top plate of the trimmer is the one which is grounded. This plate is directly under the screw head. Bend lug to be soldered very carefully in such a way that the trimmer will stand almost upright. Solder. Mount the other five trimmers in exactly the same fashion. Now with bare wire connect the trimmer on the left to lug #2 of the switch. Solder this connection. Connect all the trimmers to the switch in accordance with Figure #8.
- ✓ 3. Select packets #56, 26 and 32. Remove coil "a" from packet #56. Run twisted lead from coil "a" through hole #14 from bottom of chassis. Do not use a grommet in this hole. Solder a spot on the chassis between sockets "Q" and "L". Solder foot of coil directly to chassis spot so that coil stands upright. Remove resistor "b" from packet #26. Crimp one lead of resistor "b" into lug #4 of socket "L". Ground other lead of resistor "b". Remove condenser "c" from packet #32. Crimp one lead of condenser "c" into lug #4 of socket "L". Connect other lead of condenser "c" to top of coil "a". Connect open end of wire from lug #5 of switch to top of coil "a". Solder this entire joint.
- ✓ 4. Select packets #20 and #34. Remove condenser "d" from packet #34. Crimp one lead of condenser "d" into lug #6 of socket "L". Ground other lead of condenser "d". Remove resistor "e" from packet #20 and crimp one lead of this resistor into lug #6. Solder lug #6. Leave other lead open for present.
- ✓ 5. Select packets #51, 34 and 15. Remove coil "f" from packet #51 and mount in hole #16 in manner previously described. Note that one lead is red and one is blue. Prepare blue lead of coil "f" and crimp into lug #8 of socket "L". Use spaghetti. Solder lug #8. Remove condenser "g" from packet #34. Ground one lead of condenser "g". Twist other lead to open lead of resistor "e". Prepare red lead of coil "f" and twist to junction of condenser "g" and resistor "e". Remove resistor "h" from packet #15. Twist one lead of resistor "h" to junction of red lead, condenser "g" and resistor "e". Solder entire joint. Leave other lead of resistor "h" unconnected for present.
- ✓ 6. Select packets #18 and 34. Remove condenser "i" from packet #34. Thread one lead of this condenser through lug #2 of socket "Q" and crimp on lug #1 of socket "Q". Solder lug #1 of socket "Q". Be extremely careful of short circuits while working on this small socket. Ground other lead of condenser "i". Remove resistor "j" from packet #18. Crimp one lead of resistor "j" into lug #2 of socket "Q". Twist other lead of resistor "j" to open lead of resistor

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"h". Solder up lug #2 of socket "Q". This junction of "h" and "j" is Et Junction #4.

7. Select packets #19, 29 and 55. Remove resistor "k" from packet #19. Crimp one lead of resistor "k" to lug #7 of socket "Q". Thread other lead of resistor "k" through lug #5 and crimp into lug #6 of socket "Q". Solder lug #6. Remove coil "l" from packet #55. Prepare chassis spot beside socket "Q" and solder foot of coil directly to spot. Crimp tap (small wire) of coil into lug #7 of socket "Q". Solder lug #7. Remove condenser "m" from packet #29. Crimp one lead of condenser to top of coil "l". Crimp other lead of condenser "m" to lug #5 of socket "Q". Solder lug #5. Connect top of coil "l" to #1 lug of switch with a straight piece of bare wire. Solder both connections. The final connection of operation #7 is taking a piece of hook-up wire from packet #74 and snipping off a piece of wire about three inches in length. Tin one end of the wire and push other end of wire back into the insulated sleeving. Crimp the tinned end of wire around the bare lead which connects top of coil "l" to lug #1 of switch. A point at about the middle of this wire is all right. Solder securely. Take the other end of the hook-up wire to the lead which connects top of coil "a" to switch and tightly wrap two turns around the bare wire. Be sure there is no electrical contact between this end of hookup wire and bare wire. Snip off excess hook-up wire. This wire is known as a "GIMMICK". Check entire operation with Figure #8. Solder all connections.

OPERATION #8

1. Operation #8 shall consist of the installation of one power transformer and associated circuits. In this step holes W, R, M, #1, #15, #23, #24, #25, #26, #31 and #32 will be utilized as well as socket "S". Select package #2 and open. This unit is the low voltage power transformer. Mount transformer over screw holes #23, #24, #25, #26. Bring the following leads through hole "W": The two green, two brown and the two black leads. Bring the following leads through hole "R": Two yellow, two red and the striped lead. (Red and yellow tracer). Holes "W" and "R" should coincide with the proper lead outlets which are at the bottom of the transformer. If they do not, then turn the transformer around.
2. Select packet #70 and withdraw four self-tapping screws. Secure feet of transformer into holes #23, #24, #25, and #26 with these screws using an 8 inch screw driver. Screw heads should be on topside of chassis.
3. Before connecting any transformer wires together a word of caution is in order. The wire inside the sleeving is coated with an enamel insulation. After cutting and skinning off the excess cotton insulation when making a joint it is extremely important that the bare wire be sanded until bright with an emery cloth or sandpaper. Take the two green leads and twist together. Take the striped lead (red and yellow) and twist in with the green wires. Lay this cable flat on chassis and run over toward socket "Q". One green lead is to be crimped into Lug #3 of socket "Q" and soldered securely. At the point where this cable passes by socket "S" the other green lead and the striped lead should be cut and securely grounded to the ground spot.
4. Wiring of the red pair and the yellow pair will proceed next. Twist the red leads together and solder one lead to lug #6 of socket "S". Solder other lead to lug #4 of socket "S". Twist yellow leads. Solder one lead to lug #2 and the other lead to lug #8 of socket "S".
5. Select packets #67, #73, #49, #70, and #74. Remove can condenser from packet #49 and mount in hole "M" in manner outlined in operation #4. Note that there are four lugs in center of this condenser. Remove choke from packet #67 and

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one grommet from packet #73. Place grommet in hole #15. Place choke on top side of chassis so that it's feet are directly over holes #31 and #32. Remove two self-tapping screws from packet #70. Secure choke with screws. Run the two choke leads through the grommet hole. Thread the black lead through one center lug of can condenser and crimp into the adjacent lug. Refer to Figure #8. Thread the red lead through the other two lugs of the condenser and crimp. Remove hook-up wire from packet #74 and connect the two lugs which are connected to the black choke lead to lug #8 of socket "S". Solder all three lugs. Connect the two resistors which make up B+ junction #4 to the other two lugs of the can condenser. Solder all lugs. This point is designated as B+ main junction on Figure #9. Now with hook-up wire run a branch from B+ main junction to B+ junction #1. Push hook-up wire down close to chassis. Solder to B+ junction #1. Using hook-up wire connect B+ main junction to B+ junction #2. With hook-up wire join B+ junction #2 to B+ junction #3. Solder all junctions.

6. Select packet #47 and remove control which fits into hole #1. Mount securely in hole #1. Connect low lug of brightness control to B+ main junction and solder. Be sure to push this lead down on chassis and route wire in accordance with Figure #9.

OPERATION #9

1. Operation #9 shall consist of the wiring of socket "V" and the utilization of holes #6, #7, #8, #27, #28, #29, #30, #13, "U" and "T". Select package #1 and remove high voltage power transformer. Select packet #70 and remove four self-tapping screws. Position low voltage transformer in accordance with Figure #10. Be sure that the red, green, and orange leads come through hole "U" and that the other leads come through hole "T". Secure transformer to chassis with self-tapping screws. Select packet #73 and remove one grommet. Place grommet in hole #13. Run red lead from hole #13 through grommet. Twist green leads and run to socket "V". Snip, clean, skin, and crimp one lead into #1 lug of socket "V". Crimp other lead into #4 of socket "V". Solder lug #1 but not lug #4. See Figure #10.
2. Select packet #37 and remove the condensers "a" and "b". Solder a spot to side apron of chassis. Solder one mounting ring of the condenser closest to the underside of the chassis. Place condenser "b" next to condenser "a" with its soldering lug directly on top of the ring of condenser "a". Solder directly to ring. Twist the two adjacent leads together from each condenser (the ones closest to front apron of chassis) and twist the orange lead from the transformer to this connection. Do not solder yet.
3. Select packets #62 and #73. Remove the A.C. cord and plug from packet #62, and one grommet from packet #73. Mount grommet in hole #35. Take the black pair of leads from the low voltage transformer and twist leads. Do likewise with the black pair from the high voltage transformer. Now take one black lead from each transformer and connect together. Crimp this joint into one lug of the A. C. switch which is mounted on rear of control in hole #1. Now join the unconnected black leads from each transformer together and solder. Now thread A. C. cord through grommet in hole #35 from outside of chassis. Bring end of A. C. cord over to the A. C. switch. Split the A. C. cord along its length for a distance of about three inches. Skin and crimp one lead of A. C. cord into the other lug of the A. C. switch. Solder this joint. Skin and crimp the other lead of the A. C. cord to the junction of the other two black leads. Solder this joint. Wrap this joint with friction tape to insulate. Solder other lug on switch.
4. Select packets #21, #38 and #74. Remove resistor "c" from packet #21. Crimp one lead of resistor "c" into high lug of control in hole #1. Ground other

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lead of resistor "c". Remove condenser "d" from packet #38. Crimp one lead of condenser "d" into center lug of control. Crimp other lead into low lug of control. Remove hook-up wire from packet #74. Crimp one end into center lug and take along chassis to the twisted junction of condensers "a" and "b" and orange lead of high voltage transformer.

5. Select packets #42 and #43. Remove two controls from packet #42. Note that there are two insulating fibre washers on each control. Mount these controls in holes #8 and #7. These controls are the same value and thus are interchangeable. Before inserting into hole slip the thick washer on shaft. After insertion into hole slip the thin washer on the shaft. Be sure that this control is centered in the large hole and that it is kept centered during time while nut is being run down. Note also that one side of each washer is smooth and that one side is ridged. The washers should be mounted so that the two ridges meet through the hole. This provides additional insulation. Remove control from packet #43. Mount in hole #6. This control does not require insulating washers.
6. Select packets #22, #65, and #74. Remove resistor "e" from packet #22 and crimp into low lug of control in hole #6. Remove hook-up wire from packet #74 and connect other lead of resistor "e" to junction of condensers "a", "b", and orange lead. Solder this junction. Also crimp one brown lead of low voltage transformer to the end of resistor "e". Remove leads from packet #65 and select one lead. Skin the ends and solder one end to the junction of brown lead, and resistor "e". Run this lead through hole "p".
7. Select packet #64 and remove picture tube socket. Note that small numbers are embossed below each hole. Remove bolts from socket and slip collar out of center of socket. Note that numbers are embossed below each lug on the inside. The procedure to be followed on the wiring of this socket is as follows: Remove collar and slip lead to be joined to the predetermined lug through the proper hole in the collar. In other words if a lead is to be soldered to lug #1 of picture tube socket it must first pass through #1 hole in collar. Now take the lead which joins the junction of brown lead and resistor "e" and slip through hole #1 of collar. Now solder one 3 inch length of bare wire to lug #2, and leave other end free. Crimp one 3 inch length of bare wire to lug #1 and leave other end free. Crimp lead wire into lug #1 of socket. Solder lug #1. The purpose of the bare wires is to join lugs #1 and #2. But this cannot be done until entire wiring job is performed and collar replaced.
8. Take the lead which passes through hole #22 and solder to lug #3 of picture tube socket.
9. Select another lead and join to the unconnected brown lead of low voltage transformer. Solder these two leads and wrap friction tape neatly around joint. Take this lead through hole "p" and solder to lug #14 of tube socket.
10. Select another lead and join center of control in hole #6 to #5 lug of picture tube socket. All these leads must pass through hole "p" with exception of lead in hole #22.
11. Select packets #26 and #65. Remove the extra lead from packet #65. This is high voltage hook-up wire. Remove one more lead from packet #65 and resistor "f" from packet #26. Connect long lead to one end of resistor "f". Connect high voltage hook-up wire to same end of resistor "f". Solder this joint. Crimp other end of resistor "f" into center lug of control in hole #8. Feed long lead through hole "p" and connect to lug #8 of picture tube socket. Run hook-up lead to open lug of condenser which is mounted on #2 lug of terminal strip. Solder to condenser lug. Solder all connections. Repeat the entire

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procedure using resistor "g" from packet #26 and long lead from packet #65. Solder resistor "g" into center lug of control in hole #7. Run long lead through hole "P" to lug #10 of picture tube socket. Run high voltage hook-up wire to open lug of condenser mounted in lug #3 of terminal strip. Solder all connections. With high voltage hook-up wire connect low lug of control #8 to low lug of control #7. With high voltage hook-up wire connect high lug of control #8 to high lug of control #7. Connect high voltage hook-up wire to low lug of control #7 and run over chassis to lug #2 of socket "V" and crimp into lug. Refer to Figure #10.

- ✓ 12. Select packets #15 and #21. Remove resistor "h" from packet #15. Crimp one lead of resistor "h" into lug #4 of socket "V". Crimp other lead of resistor "h" into lug #3 of socket "V". Solder lug #4. Remove resistor "i" from packet #21 and crimp one lead into lug #3 of socket "V". Crimp the open lead of condenser "b" into lug #3 of socket "V". Solder lug #3 of socket "V". Crimp other lead of resistor "i" into lug #2 of socket "V". Crimp open lead of condenser "a" to lug #2 of socket "V". Solder all connections. Refer to Figure #10.
- ✓ 13. Select packets #26 and #65. Remove resistors "j" and "k" from packet #26 and twist together. Solder this junction and crimp the other end of one resistor into the open lug of condenser in lug #1 of terminal strip. Crimp end of other resistor into open lug of condenser in lug #4 of terminal strip. Solder these connections. Connect one long lead from the condenser which is in lug #1 of terminal strip. Run through hole "P" and solder to #7 of picture tube socket. Connect one long lead from the condenser which is in lug #4 of the terminal strip and run through hole "P" to lug #11 of picture tube socket. Connect high voltage hook-up wire to the junction of resistors "j" and "k". Leave other end of hook-up wire open for the present.
- ✓ 14. Select packets #21 and #24. Remove resistors "l" and "m" from packet #21 and remove resistors "n" and "o" from packet #24. Lay these four resistors in a line and twist adjacent leads together so that the resistors form a "string". Solder these connections. Crimp open lead of resistor "l" into low lug of control #8. Crimp open lead of resistor "o" into high lug of control #6. Solder these connections. Now connect the open end of the hook-up wire to the junction of resistors "l" and "m". Solder. Select the last long lead from packet #65 and connect to junction of resistors "l" and "m". Run through hole "P" and connect to lug #9 of picture tube socket.
- ✓ 15. Replace collar on picture tube and be sure to thread the two bare wires thru holes #1 and #2 of collar. Replace bolts and nuts and tighten collar in socket. The last socket job will be twisting the two bare wires together and soldering this connection. Snip off excess.
- ✓ 16. Connect the junction of resistors "n" and "o" to the high lug of control #7 with a small piece of bare wire. Refer to Figure #10.
17. Remove knobs from packet #66 and place five knobs on control shafts on front apron of receiver. Place the two knobs on the control shafts of controls #7 and #8.
- ✓ 18. Remove antenna post from packet #61 and place over holes #36 and #37. Remove two self-tapping screws from packet #70 and fasten antenna post to chassis. Crimp one lead of twisted pair coming through hole #14 into each soldering lug of antenna post. Solder. Push leads down on chassis.
- ✓ 19. Select packet #63 and remove high voltage bakelite cap. Remove metal spring from inside bakelite and unsolder attached lead. Thread red lead through hole in bakelite cap and solder to metal spring. Replace spring in bakelite cap.

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20. Select package #3 and packets #68 and #70. Remove speaker from package #3. Remove output transformer from packet #68. Mount output transformer directly on flange of speaker with nuts and bolts from packet #70. Be sure that the enameled leads are toward cone and that the insulated leads are away from cone. Clean enameled leads and solder in soldering lugs of speaker. Place speaker directly over hole #38 with output transformer up and screw speaker directly to chassis. Caution: Do not allow screw driver to slip out of screw slot as it may damage cone. Connect the two leads coming from speaker to the two leads coming through hole #20. Be sure to twist the speaker leads before connecting. Tape these connections and press down on chassis. The kit is now completed and is ready for the operating instructions. Check circuit with schematic diagram.

PACKET AND PACKAGE PARTS LIST

Packet #1	15 Socket Rings	Packet #51	First Video I.F. Coil
Packet #2	12 Sockets (8 Prong)	" #52	Second Video I.F. Coil with sound winding
" #3	1 Socket - Ceramic (8 Prong)	" #53	Third Video I.F. Coil
" #4	1 Socket (4 Prong)	" #54	Fourth Video I.F. Transformer
" #5	1 Miniature Socket (7 Prong) W/Self-tapping Screw	" #55	1 - Oscillator Coil
" #6	10 Ft. Heater Wire	" #56	1 - Antenna Coil
" #7	10 Ft. Ground Wire	" #57	1 - Terminal Strip
" #8	3 - 200 Ohm Resistor $\frac{1}{2}W$	" #58	1 - First Peaking Coil
" #9	4 - 500 Ohm Resistor $\frac{1}{2}W$	" #59	1 - 2nd Peaking Coil
" #10	1 - 1000 $1W$	" #60	2 - Speaker Wires
" #11	5 - 2000 ohm $\frac{1}{2}W$	" #61	1 - Antenna Post
" #12	1 - 2000 ohm $1W$	" #62	1 - A.C. Cord and Plug
" #13	1 - 3000 ohm $\frac{1}{2}W$	" #63	1 - High Voltage Cap
" #14	1 - 3000 ohm $1W$	" #64	1 - Picture Tube Socket
" #15	7 - 5000 ohm $\frac{1}{2}W$	" #65	11 - Picture Tube Socket Leads
" #16	1 - 5000 ohm $1W$	" #66	7 - Knobs
" #17	3 - 10,000 ohm $\frac{1}{2}W$	" #67	1 - Choke
" #18	1 - 10,000 ohm $1W$	" #68	1 - Output Transformer
" #19	1 - 30,000 ohm $\frac{1}{2}W$	" #69	20 Ft. Solder
" #20	10 - 50,000 ohm $\frac{1}{2}W$	" #70	2 nuts - 2 bolts 13 self-tapping screws
" #21	8 - 100,000 ohm $\frac{1}{2}W$	" #71	2 Ft. Spaghetti
" #22	6 - 250,000 ohm $\frac{1}{2}W$	" #72	1 Socket (Loktal - 8 Pin)
" #23	1 - 500,000 ohm $\frac{1}{2}W$	" #73	5 Grommets
" #24	7 - 1 Meg. Ohm $\frac{1}{2}W$	" #74	Hook-up Wire
" #25	3 - 2 Meg. Ohm $\frac{1}{2}W$		
" #26	5 - 5 Meg. Ohm $\frac{1}{2}W$		
" #27	1 - 10 Meg. Ohm $\frac{1}{2}W$		
" #28	7 Trimmer Condensers	Package #1	1 - High Voltage Transformer
" #29	1 - 50-80 MMF Condenser	" #2	1 - Low Voltage Transformer
" #30	1 - 50 MMF Condenser	" #3	1 - Speaker
" #31	4 - 200 MMF Condensers		
" #32	1 - 250 MMF Condenser		
" #33	1 - .001 MFD Condenser		
" #34	20 - .005 MFD Condensers		
" #35	3 - .01 MFD Condensers		
" #36	4 - .01 MFD Condensers (2000V)		
" #37	2 - .05 MFD Condensers (2000V)		
" #38	7 - .1 MFD Condensers		
" #39	1 - .25 MFD Condenser		
" #40	1 - 100,000 ohm control		
" #41	3 - 2 Meg. Ohm Controls		
" #42	2 - 2 Meg. Controls w/insulators		
" #43	2 - 500,000 Controls		
" #44	1 Tuner		
" #45	1 Station Switch		
" #46	1 - 10K to 50 K Control		
" #47	1 - 100,000 ohm With SW		
" #48	1 Can Condenser 4 x 10 at 450V		
" #49	1 Can Condenser 4 x 10 at 450 V		
" #50	1 Discriminator Coil Complete		

Alignment and Operating Instructions for Completed 7 Inch Television Receiver

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:

<u>SOCKET</u>	<u>TUBE</u>
✓ A	6Y6
✓ B	12X6
✓ Q	6J6
✓ L	6AC7/1852
✓ K	6AC7/1852
✓ J	6AC7/1852
✓ C	6AC7/1852
✓ P	6AC7/1852
✓ F	6SN7
✓ G	6SN7
✓ H	6SN7
✓ D	6SN7
✓ I	6SN7
✓ N	6SN7
S	504G
Y	2x2/879

The picture tube used with this kit is the 7GP4 kinescope. Caution: Do not plug set into A.C. outlet yet!

Location and Function of Controls

1. Sound Volume:
This control is mounted in hole #5 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 #4 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.

Alignment and Operating Instructions for Completed 7 Inch Television Receiver

3. **Station Selector:**
This control is mounted in hole #3 on front apron and its function is to switch in the desired television channel. This receiver is equipped to receive three channels.
4. **Fine Tuning:**
This control is mounted in hole #2 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 with the picture. Any deviation in sound as would 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 #1 on front apron and its function is to adjust the over all brightness to the viewer's satisfaction. Whenever the contrast control is adjusted the brightness control should also be adjusted in order to insure perfect picture reception. Never use this control at full clockwise setting. The A.C. power switch is also mounted on this control.
6. **Focus:**
This control is mounted in hole #6 on rear apron and its function is to sharpen the line formation of the raster which will insure clearest picture. Always adjust this control with an insulated tuning stick. (or any wooden or fibre stick shaped like screw driver)
7. **Centering Controls:**
These controls are mounted in holes #7 and #8. The function of these controls is to center the picture both horizontally and vertically. **Warning:** The shafts of these controls are **hot!** That is, they are charged with electrostatic voltage. Make all adjustments to these controls with knobs on shafts! Always use one hand while making adjustments. Do no place other hand on chassis at any time!
8. **Horizontal Hold:**
This control is mounted in hole #2 on rear apron and its function is to control the speed of the line scans. The proper setting of this control can only be achieved while a picture is being transmitted by the local station. When adjusted the picture elements will fall in their proper places and one picture will be observed. When out of adjustment the elements will race across the screen or two pictures side by side will appear. A little practice with this control will soon acquaint user with its proper manipulation. After it is once set so that the picture is properly synchronized no further adjustments need be made.
9. **Horizontal Size:**
This control is mounted in hole #11 on rear apron and its function is to control the width of the picture in a horizontal direction. After picture is "synched" with the horizontal hold control its horizontal width can be adjusted to viewer's satisfaction by adjusting this control. Once proper width is achieved no further adjustments need be made to this control.
10. **Vertical Hold:**
This control is mounted in hole #10 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 may bright lines will appear on the picture. Adjust control

Alignment and Operating Instructions for Completed 7 Inch Television Receiver

until a stationary frame appears on screen.

11. Vertical Size:

This control is mounted in hole #9 on the rear apron and its function is to adjust the height of the picture to the viewer's satisfaction.

All controls on the rear apron of the receiver should be adjusted properly when the receiver is located in its permanent place. Under normal circumstances they should not require readjustment thereafter.

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

1. Remove the 5U4G and the 2 x 2 from their respective sockets and with friction tape cover the bakelite cap which connects to the top of the 2 x 2. This is a precaution which is necessary because this cap carries a charge of 2000 volts A.C. and constitutes a dangerous shock hazard if accidentally touched.
2. Plug in A.C. cord to outlet. Turn on A.C. switch. Observe the glass tubes closely and look for the heaters to light up. If a short exists in this circuit a sharp hum will be heard in the low voltage transformer and heaters will not light. If so turn off set immediately and check entire heater circuit. If O.K. proceed to second hot check.

Second Hot Check (low voltage) For all troubles refer to service notes in technical section.

1. With switch off replace 5U4G tube in its proper socket. Now connect load speaker leads (red and blue) to twisted leads which come through hole #20 of chassis. If already connected, disregard. Advance volume control fully clockwise and stand chassis in such a way so that the 5U4G can be observed as well as the underside components of the chassis. Turn on switch and observe 5U4G tube closely. Heaters inside glass envelope should be observed to light up but the heavy plates should not begin to glow. If plates begin to glow inside 5U4G it indicates a short circuit. Turn set off immediately. If O.K. glance at underside components. If any component is observed to sizzle or smoke turn set off immediately. This also indicates a short circuit. Recheck entire circuit and see that tubes are in proper sockets. If O.K. and none of these warning signs occur then take screw driver and tap metal end around lugs on station selector. If sharp scratching noises are heard in speaker then this indicates that the set is hot. In other words you are ready for the third hot check. Turn off set. Pull out plug!

Third Hot Check (high voltage) For all troubles refer to service notes in technical section.

1. Place 2 x 2 tube in its socket and remove tape from bakelite cap. Place bakelite cap on top of 2 x 2 tube. Very carefully remove 7GP4 picture tube from carton but leave cardboard collar on tube. Place picture tube socket on base of picture tube very firmly. Check high voltage circuit visually and be sure all components are not too close to chassis. With switch off replace A.C. plug in outlet. Keep hands off set! Turn on A.C. switch and observe neck of picture tube closely to see heater glow. Also observe high voltage circuit to detect any arcing or smoke. If O.K. observe screen of picture tube for appearance of white spot. If spot appears and remains stationary for more than five seconds then turn off set and adjust horizontal and vertical hold controls. Try again. Spot should begin to move and then trace out a square of light which fills face of tube. This is known as the raster. If a single vertical line appears then manipulate horizontal hold control to get raster. If a single horizontal line appears then

Alignment and Operating Instructions for Completed 7 Inch Television Receiver

manipulate vertical hold control to get raster. Keep brightness control retarded so that screen will not burn a spot, a horizontal line or a vertical line. After raster appears adjust focus control for clearest line formation and size controls for the desired raster size. If raster is off center, then adjust centering controls. You are now ready for the alignment of the receiver for 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:
 - 1 pair earphones.
 - 1 .1 condenser at 400V.
 - 1 tuning stick.
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 a clip to the open lead of the condenser. Clip the earphone lead to the chassis and the condenser lead to the #5 lug of socket "G". Turn set on. 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 selector switch to position #3. That is its extreme clockwise position. This activates the trimmer condensers which are connected to the #4 and #8 lugs of the selector switch. Be sure that picture tube is connected to socket. Place phones on head and turn on set. Allow a full minute for warm-up.
 - (c) Tap mixer coil lead and observe raster. If it jumps, circuit is functioning. If not this indicates that something is wrong in one of the video stages. (see technical section). This should also produce noise in earphones.
 - (d) With tuning stick slowly turn trimmer screw of the trimmer in #4 lug of switch counter clockwise and at the same time rotate the fine tuning condenser slowly. Listen for a loud buzz in phones.
 - (e) If results are negative then turn trimmer screw of the one in #8 lug of switch counter clockwise about one half turn and repeat tuning with trimmer in #4 lug.
 - (f) When buzz is heard, center its loudest intensity with fine tuning control plates about three-fourths meshed. Return to trimmer in #8 lug of switch and adjust screw for maximum buzz. If buzz gets too loud or cuts off reduce contrast control setting. Keep brightness very low. Do not touch trimmer on #4 lug after this adjustment is made.
 - (g) Picture content should appear on raster but probably will be streaking or jumping. Adjust hold controls until one picture is on screen. Adjust size controls until desired size is achieved and center picture with centering controls. Adjust brightness control until satisfactory brilliance is attained. Focus picture until sharpest detail is observed.
 - (h) Remove earphones but do not disturb picture adjustments. Locate trimmer which is mounted on #4 lug of socket "K". Turn screw of this trimmer until the associated sound is heard in speaker. Adjust for maximum volume. Turn to trimmer which is mounted on top of sound coil. Adjust this trimmer until

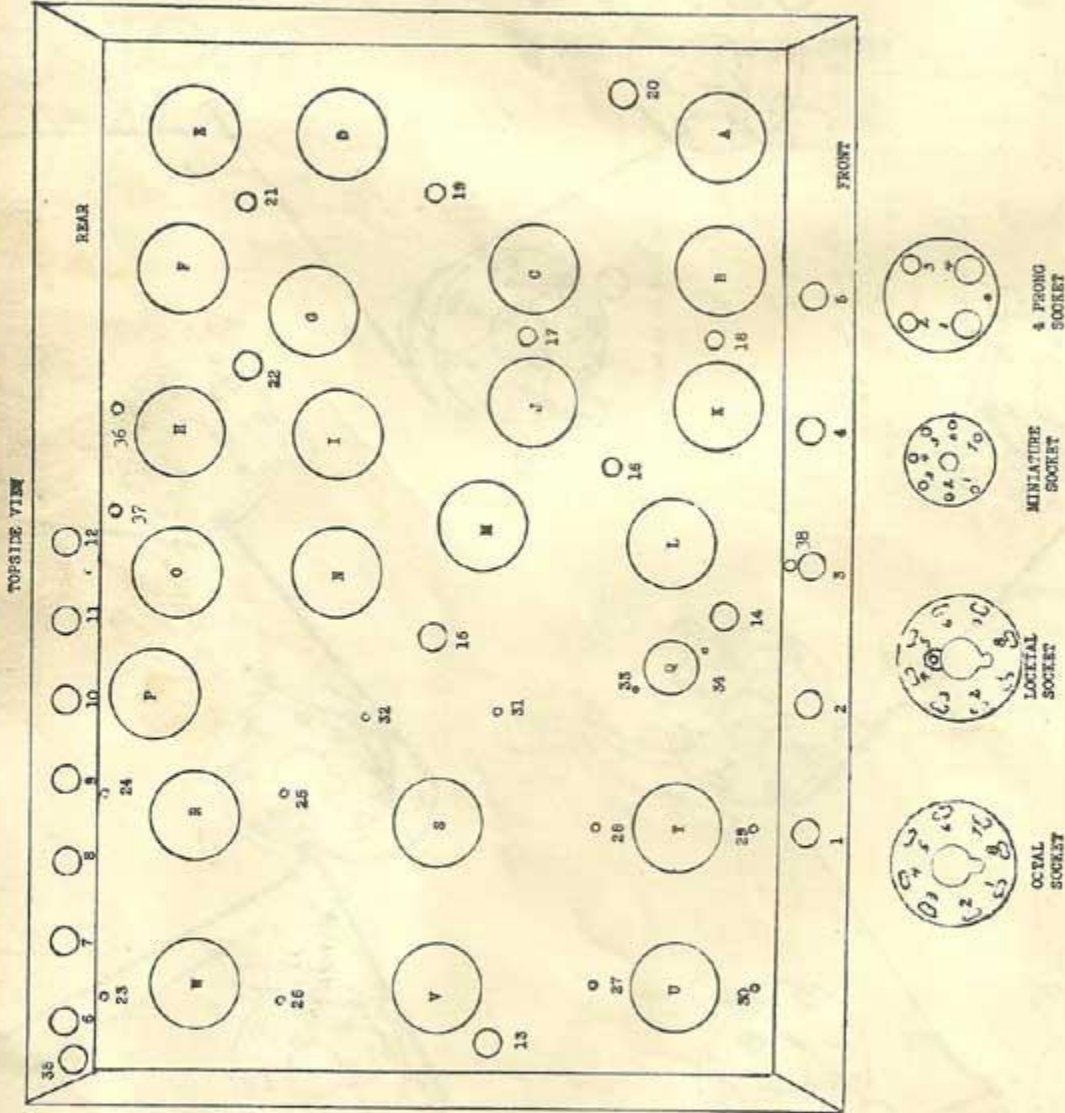
Alignment and Operating Instructions for Completed 7 Inch Television Receiver

best quality of sound is received with least incidental noise.

- (i) If picture breaks or streaks horizontally adjust trimmer which is connected to #1 lug of tube "E" and at the same time delicately adjust the horizontal hold control. Between these two adjustments satisfactory results should be attained. Note: All these adjustments should be made before receiver is placed in cabinet.
- (j) By turning the station selector one position counter-clock-wise the same or a different station can be tuned in. This middle setting activates trimmers #3 and #7. Follow the same procedure in adjusting these trimmers. Bring the station "in" with trimmer #3. "Peak it up" with trimmer #7. Position #1 of selector switch activates trimmers #2 and #6. Follow the prescribed procedure.
- (k) For all difficulties encountered refer to the technical section for service notes.
- (l) Note: It is possible to get the picture on the screen but the wrong sound carrier. Some F.M. station may come through with the picture. If this happens return to trimmer in lug #4 (see note "b") and turn screw about $1\frac{1}{2}$ to 2 turns counter-clock-wise. The picture will disappear but should reappear with this new setting accompanied by its associated sound carrier. The first picture signal which you may have received is known as an "image".
- (m) After picture is satisfactorily received it is necessary to tune the tuner away from each "side" of picture. You will notice that at a certain setting picture will be strongest. Turning this control one way will reduce its strength but will not improve its quality. Turning this control the other way will reduce its strength but will improve its quality. This is the desired picture. Increase its strength by adjusting the contrast control clockwise.
- (n) If it is found that picture and sound are slightly off, that is, that they come in on different settings of the tuner then set tuner to the point where sound comes in best and turn slugs of third and fourth video I.F. coils. This should bring the picture in with the sound. Notice the small holed nuts on each coil form. Whenever adjustments are made to the slugs, loosen the small holed nuts. When final adjustments are made tighten small holed nuts finger tight.
- (o) The 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. Full instructions on installation should be furnished with each kit.
- (p) 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 your set off when not in use. This will extend the life of the picture tube.

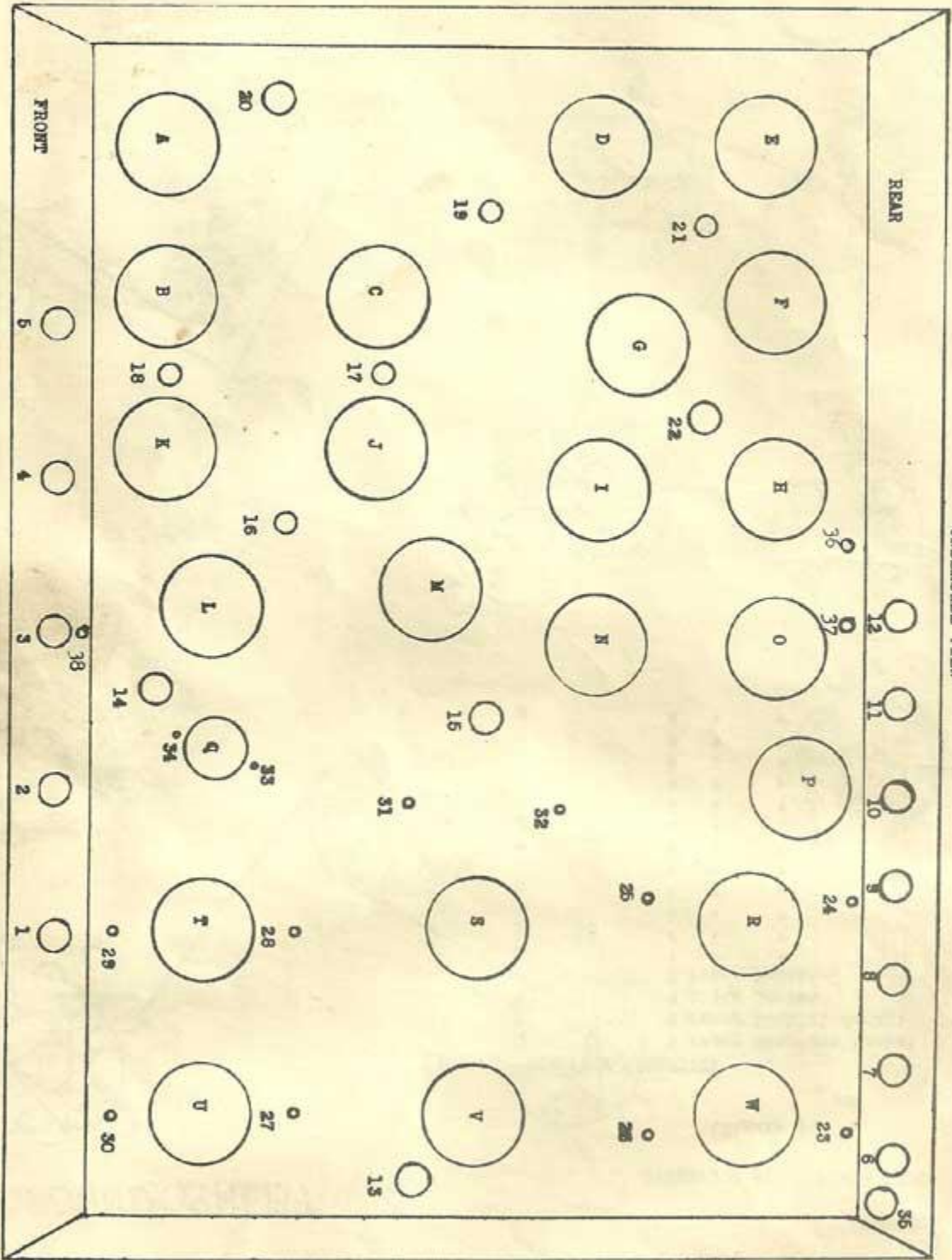
MASTER SHEET OF CHASSIS HOLE NUMBERING

Figure #1



LOC NUMBERING OF SOCKETS
(TOPSIDE VIEW)

UNDERSIDE VIEW



T Y P I C A L

TROUBLES & CURES

-on-

7 INCH TELEKIT

Figures referred to are found
on test chart sheet.

Symptoms	Possible Cause	Remedy
(A) No light, or light not properly centered on picture tube and cannot be properly centered by center control, yet voltages are O.K. (See Figs. 36, and 38)	(a) One or more leaky or shorted 2000 volt coupling condenser in coupling circuit; (b) Wires leading to plates of picture tube are squeezed against chassis; or (c) Wires to picture tube socket are not adequately insulated;	(a) Replace condenser or condensers; (c) Dress wires; (d) Insulate wires;
(B) PICTURE JUMPS VERTICALLY. (Figs. 28, 38)	(a) Filtering of sync. separator circuit is not adequate for receiving conditions in this particular location; or (b) Leaking coupling condenser either in sync separator circuit or vertical oscillator circuit or vertical amplifier circuit.	(a) Increase one meg. resistor to a 2 meg. resistor, or add a .05 condenser to input grid of vertical oscillator tube; (b) Replace leaking condenser.
(C) PICTURE TEARS HORIZONTALLY, or HORIZONTAL HOLD CONTROL IS CRITICAL (See Figs. 27, 42).	(a) Bad separator tube; or (b) A leaking coupling condenser between first video and second video tubes; or between first video and separator tubes; or between separator tube and horizontal oscillator tube; or between horizontal oscillator tube and horizontal amplifier tube or tubes; or (c) Abnormal low plate voltage in sync separator tube;	(a) Replace; (b) Replace; (c) Increase plate voltage.

TYPICAL TROUBLES and CURES ON 7 INCH TELEKIT

Symptoms	Possible Cause	Remedy
(D) HUM OR RIPPLE ON SCREEN.	(a) Open condenser in high or low voltage circuits; or (b) Shorted or leaking coupling condensers in deflection circuits or in video circuit; or (c) By #14 and #1,2 wires being reversed.	(a) Repair or Replace; (b) Replace; (c) Check if #14 and 1,2 wires on picture tube socket are connected to their proper places.
(E) OSCILLATION OR INTERFERENCE IN VIDEO OUTPUT. MOST NOTICEABLE WHEN CONTRAST CONTROLS ARE TURNED ON FULL.	(a) Condenser is open between 1000 ohm resistor and ground in circuit feeding B+ to mixer tube. (b) Condenser is open in screen grid of I.F. circuits; or (c) Condenser is open between 1000 ohm resistor and ground in plate circuits of the I.F.; or (d) Wrong value or defective resistor between grid and ground of video I.F. tube; or (e) Open condenser between cathode and ground of the I.F. tubes; (f) Outside interference such as excessive auto ignition interference, diathermy interference, beat frequency interference.	(a) If condenser is open due to rosin connection, resolder it; if defective replace it; (b) Same as (a); (c) Same as (a); (d) Replace resistor with one of correct value; (e) Same as (a); (f) To verify if trouble is caused by outside interference, disconnect the aerial. If raster is O.K., the trouble is interference; if raster is not clear, then the remedy is found in (a) to (e).
NOTE: Never take out second video 6SN7 while power is on. If this tube is removed there will be no current drain on the plate of the second video. This will cause a high positive voltage on the grid of picture which might temporarily cause image distortion.		
(F) WHEN DETAIL IS MILEY, OR NOT SHARP. (See Figs. 29 and 31).	(a) Loss of high video frequencies due to I.F. coils being tuned too sharply; or (b) the Video amplifiers lack the range to amplify all the frequencies necessary for good picture reproduction; or (c) the resistors connected to the plate of the 1st and 2nd video output tubes may be off value. The resistor to the plate of the 1st video output tube should be of 2000 ohms; to the plate of 2nd video output tube should be of 3000 ohms.	(a) Replace resistor which is connected to the grid of the 1st video and resistor which is connected to grid of 2nd video with resistors of lower value (from 3000 to 2000 ohms); (b) Replace 3000 ohms resistor which is connected to the plate of 1st video amplifier with a 2000 ohm resistor; (c) Replace resistors with others of specific value.
NOTE: Before proceeding make sure focus control is properly set.		
If focus is O.K. and symptom continues; (Continued on next page)		

TYPICAL TROUBLES and CURES ON 7 INCH TELEKIT

Symptoms	Possible Cause	Remedy
(Continued from Page 2) When Detail is Milky, or Not Sharp, and Focus is O.K., but symptom continues....	(a) The two 500,000 ohm resistors in the 2000 volt bleeder circuit are off value; or (b) The fault may be in the focus control wiring; or (c) The "safety" resistor leading from the #879 tube filament to the 2000 volt filter network may be off value;	(a) Change to proper value; (b) Check Wiring; (c) If off-value, change to proper value, if it is of the speci- fied value, change to a resistor of lower value (5,000 ohms). This will slightly re- duce size of picture, but will make it sharp- er.
(G) IF BASTER OF LIGHT PAGES AFTER APPEARING FOR A FEW SECONDS, Check tube (6SN7) in the second video cir- cuit.	(a) Weak or defective 6SN7 tube.	(a) Change tube.
(H) IF PICTURE FOLDS HORIZONTAL (See Fig. 60); or	(a) The .001 Timing condenser in the horizontal oscillator circuit is defective or off-value; or	(a) Change condenser.
(I) IF THERE IS A NON- LINEAR HORIZONTAL COND- ITION. (See Fig. 61)	(b) There may be a leaking coup- ling condenser in the horizontal deflection circuit; or (c) One of the resistors in the horizontal deflection circuit off-value, most likely in one of the plate circuits.	(b) Change condenser. (c) Change resistor.
(J) PICTURE IS TOO LARGE. (Runs over the face of the tube) AND CANNOT BE SUFFICIENTLY REDUCED.	(a) Open or off-value timing condenser in the horizontal oscillator circuit; or (b) One or more of the coupling condensers in deflection cir- cuits may be too high in capacity; or (c) Wrong value grid or plate re- sistors in the deflection cir- cuits.	(a) Change condenser; (b) Change it to a condenser of smaller value. (c) Replace with cor- rect value.

TYPICAL TROUBLES and CURES ON 7 INCH TELEKIT

Symptoms	Possible Cause	Remedy
(K) IF PICTURE IS TOO SMALL (See Figs. 35, 37)	(a) Too low voltage on the plates of tubes of deflection circuits, caused by resistor being off-value or by leaking or shorted condenser; or (b) Wrong value resistors on grids of the tubes of the deflection circuit; or (c) One or more coupling condensers in the deflection circuits may be open or too small capacity.	(a) Replace resistor or condenser. (b) Replace resistors; (c) Replace condensers.
(L) VERTICAL HOLD CONTROL SEEMS CRITICAL (see Figs. 28, 32).	(a) Open or off-value condenser connected to plate of separator tube leading to vertical oscillator circuit; or (b) Open or off-value resistor leading to grid input of vertical oscillator tube; or (c) Bad vertical oscillator tube	(a) Replace condenser; (b) Replace resistor; (c) Replace tube.
(M) TOO MUCH BLACK OR TOO MUCH CONTRAST	(a) Resistor connected to plate of 1st video tube and the resistor connected to the plate of the second video tube are too high in value for the particular location of the receiver (when abnormally strong video signal is obtained, usually when receiver is located close to transmitter).	(a) Replace resistor to 1st video with one of 2000 ohms, 1 watt; and replace resistor to 2nd video with one of 2000 ohms, 1 watt.
(N) IF NO RASTER OF LIGHT.	(a) No voltage on filament of picture tube; or (b) Leaking coupling condenser leading to plates of picture tube; or (c) No voltage on the plate of the second video tube; or (d) Bad connection on picture tube socket; or (e) Bad 879 tube; or (f) Shorted condenser in the 2000 volt filter circuit; or (g) Open resistor in the 2000 volt bleeder circuit.	(a) Check wiring. (b) Change condenser. (c) Check for open peaking coil or resistor leading to plate of picture tube and replace if necessary; (d) Repair; (e) Replace; (f) Replace; (g) Replace.

TYPICAL TROUBLES and CURES ON 7 INCH TELEKIT

Symptoms	Possible Cause	Remedy
(O) IF SIGHT AND SOUND DO NOT SYNCHRONIZE	(a) Sight and sound may not be tuned to their proper frequencies. They should be 4.5 megacycles apart.	(a) Realign sight and sound IF coils;
	(b) The 6J6 oscillator may not be tuned to the fundamental frequency of the station being tuned in.	(b) Realign the oscillator to the fundamental frequency of the station being tuned in.
(P) LINES CROWDED AT THE TOP OR AT THE BOTTOM, or at BOTH TOP AND BOTTOM, (Vertical nonlinear), giving compressed image at top or bottom, or at both top and bottom. (see Figs., 41, 54, 55).	(a) Leaking vertical coupling condenser in the vertical deflection circuit; or	(a) Replace;
	(b) Defective or wrong value resistors in the plates or grids of the circuits of the vertical deflection tubes; or	(b) Replace;
	(c) Defective vertical oscillator or vertical amplifier tubes; or	(c) Replace;
	(d) May require a larger coupling condenser from vertical oscillator to vertical amplifier.	(d) Replace with a .1 or .25 condenser, whichever is larger than the condenser replaced.
NOTE:		
		If the condenser, resistors, or tubes are OK then <u>increase</u> the resistance in the vertical amplifier cathode circuit from 5000 to 7000 ohms; also <u>decrease</u> the resistance of one of the two 250,000 ohm resistors in the plates of the vertical amplifier tube circuit to about 100,000 ohms.
(Q) SINE WAVE PATTERN INSTEAD OF RASTER.	(a) Open or bad connection in .25 condenser connected to plate of vertical oscillator.	(a) Check condensers; repair or replace.
(R) NOISY FOCUS CONTROL or NOISY BRIGHTNESS CONTROL	(a) May be caused by picture tube leads pressed against chassis or wires not properly insulated at picture tube socket.	(a) Separate wires from chassis or insulate wires.

TYPICAL TROUBLES and CURES ON 7 INCH TELEKIT

Symptoms	Possible Causes	Remedy
(S) RASTER COLLAPSES TO FORM A STRAIGHT VERTICAL OR STRAIGHT HORIZONTAL LINE.	(a) Either the oscillator or amplifier in either the vertical or horizontal deflection circuit is not working.	(a) If Vertical line collapsed, use the following procedure; 1. Remove grid lead of vertical amplifier; place finger on the grid of the vertical amplifier.. if this produces a raster, the trouble is in the vertical oscillator circuit and all voltages, parts and tubes in the vertical oscillator circuit must be checked; .. if this does not produce a raster, then the trouble is in the vertical amplifier circuit and all voltages, parts and tube in the vertical amplifier must be checked; if horizontal line is collapsed use the same procedure as above in the horizontal circuits. (a) Replace condenser.
(T) PICTURE CANNOT BE CENTERED (See Figs. 36, 38).	(a) A small leak in one of the 2000 volt coupling condensers; or (b) Off-value in one of the 5 meg resistors leading to the 2000 volt coupling condensers; or (c) Off-value in the two 100,000 ohm resistors which are in parallel with the centering controls;	(b) Replace resistors with new ones of correct value. (c) Replace resistors with new ones of correct value.
(U) VERTICAL BAND ACROSS PICTURE THAT IS BRIGHTER THAN REMAINDER OF PICTURE.	(a) Leaking coupling condenser in vertical deflection circuit; or (b) Hold control improperly set.	(b) Set hold control.



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

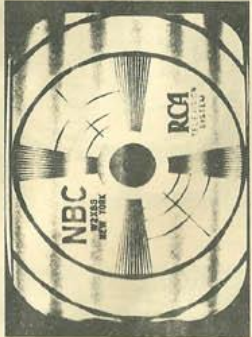


Figure 33—Sound Modulation in Picture



Figure 34—Picture Incorrectly Oriented



Figure 35—Horizontal Width Control Incorrectly Set



Figure 36—Horizontal Centering Control Incorrectly Set

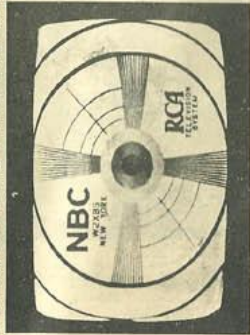


Figure 37—Vertical Height Control Incorrectly Set



Figure 38—Vertical Centering Control Incorrectly Set



Figure 39—Scanning Rate 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—Excessive Auto-initiation Interference

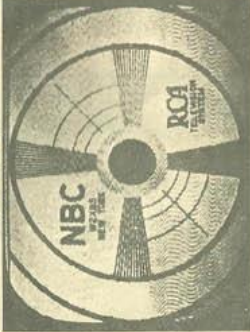


Figure 45—Excessive Diathermy Interference



Figure 46—Beat Frequency Interference



Figure 47—Excessive Ripple in Horizontal Deflection

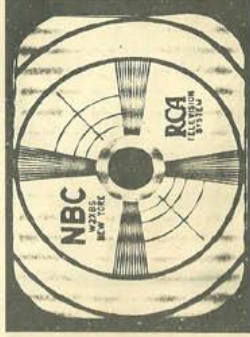


Figure 49—A 250 K.C. Sine Wave Signal with Test Pattern



Figure 50—Excessive Ripple in Video Amplifier

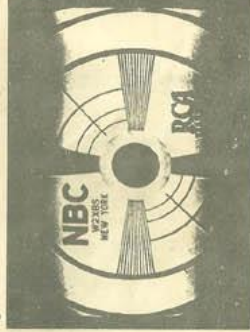


Figure 51—Same as Figure 50 Except Opposite Phase

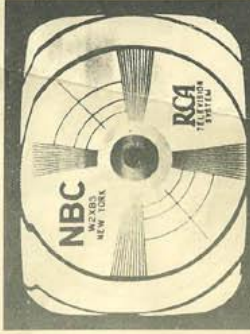


Figure 52—Unstable "Tear-Out" in Horizontal Synchronization



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

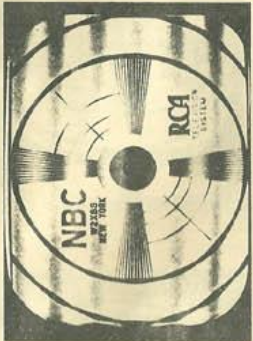


Figure 33—Sound Modulation in Picture



Figure 34—Picture Incorrectly Oriented



Figure 35—Horizontal Width Control Incorrectly Set



Figure 36—Horizontal Centering Control Incorrectly Set

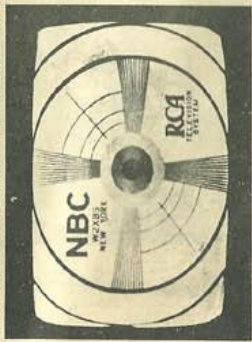


Figure 37—Vertical Height Control Incorrectly Set



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

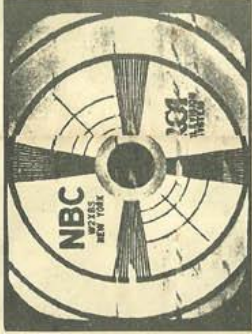


Figure 44—Excessive Auto motion Interference



Figure 45—Excessive Diathemy Interference



Figure 46—Beat Frequency Interference



Figure 47—Excessive Ripple in Horizontal Deflection

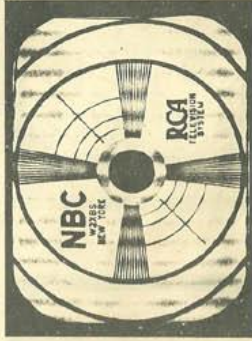


Figure 49—A 250 K.C. Sine Wave Signal with Test Pattern



Figure 50—Excessive Ripple in Video Amplifier

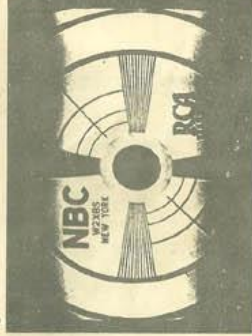


Figure 51—Same as Figure 50 Except Opposite Phase

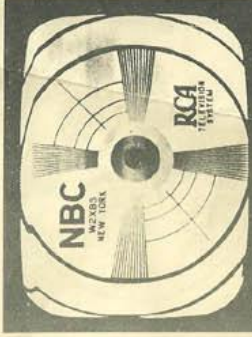


Figure 52—Unstable—“Tear-Out”—Horizontal Synchronization



Figure 53—Loss of Interlacing

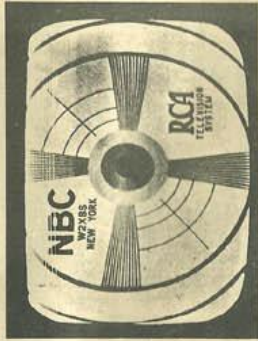


Figure 54—Excessive Ripple in Vertical Deflection



Figure 55—Vertical Distortion Caused By Defective Peaking



Figure 56—Transients in Test Pattern

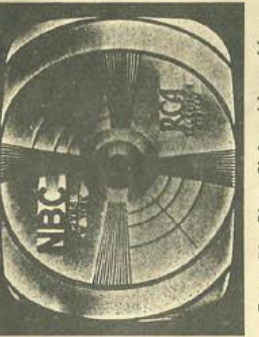


Figure 57—Phase Shift and Loss of Low Video Frequencies

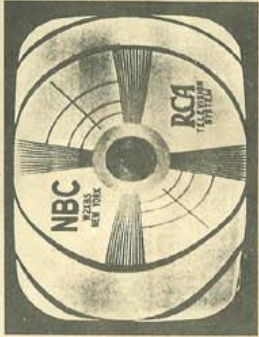


Figure 58—Loss of High Video Frequencies



Figure 59—Non-Linear Horizontal Deflection

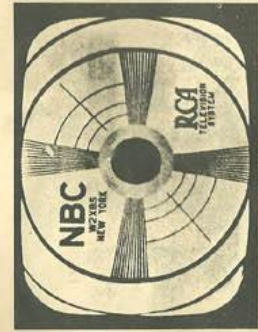


Figure 60—Effect of Damping Tube Failure

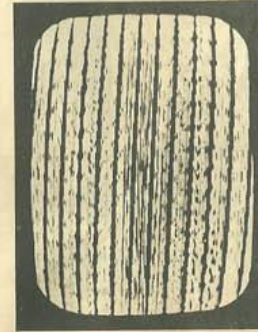


Figure 61—Loss of Interlacing



Figure 62—Vertical Distortion Caused By Defective Peaking

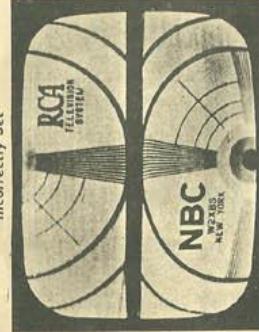


Figure 63—Transients in Test Pattern

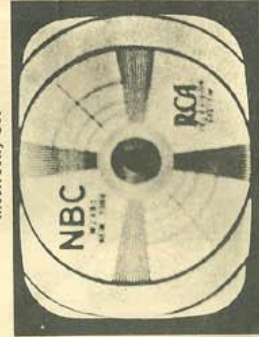


Figure 64—Phase Shift and Loss of Low Video Frequencies

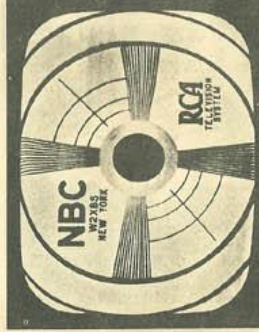


Figure 65—Loss of High Video Frequencies



Figure 66—Non-Linear Horizontal Deflection



Figure 67—Horizontal Hold Control Incorrectly Set



Figure 68—Focus Control Incorrectly Set

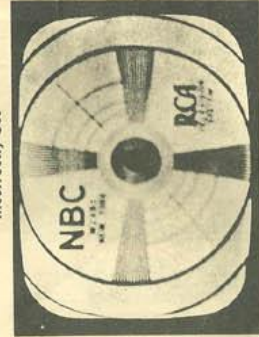
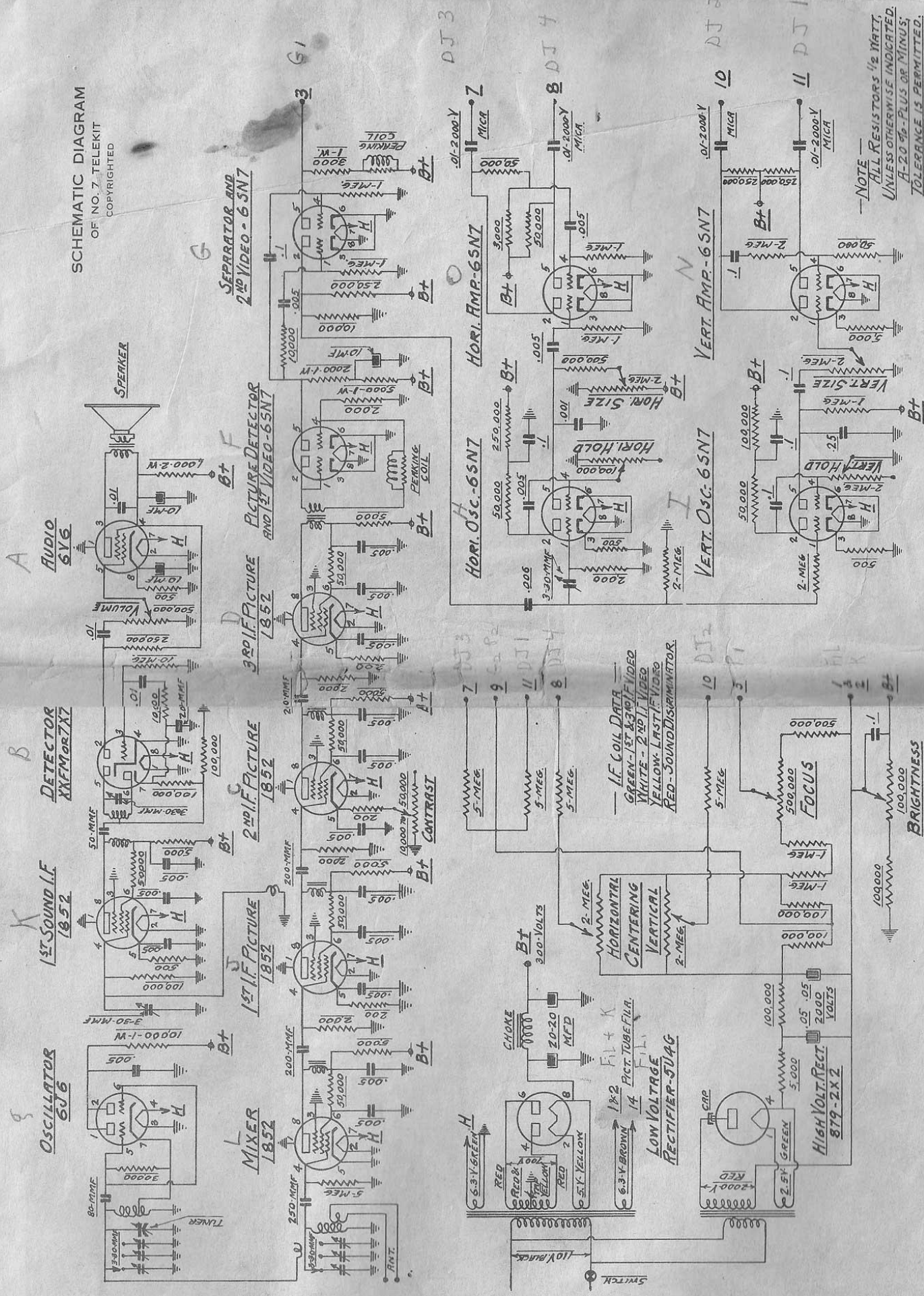


Figure 69—Brightness Control/Advanced Too Far



Figure 70—Contrast Control Advanced Too Far

SCHEMATIC DIAGRAM
OF NO. 7 TELEKIT
COPYRIGHTED



NOTE -
ALL RESISTORS 1/2 WATT,
UNLESS OTHERWISE INDICATED.
A-20 1/4-PLUS OR MINUS,
TOLERANCE IS PERMITTED.

A

B

K

S

G

D

C

L

DJ 3

DJ 4

DJ 2

DJ 1

H

I

N

7

9

11

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6

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4

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2

1

I.F. COIL DATA -
GREEN-1ST & 3RD I.F. VIDEO
WHITE-2ND I.F. VIDEO
YELLOW-LAST I.F. VIDEO
RED-SOUND DISCRIMINATOR

HORIZONTAL
CENTERING
VERTICAL
2-MEG

LOW VOLTAGE
RECTIFIER-5U4G

FOCUS
500,000
1-MEG
100,000
100,000
100,000

BRIGHTNESS
100,000

VERT. HOLD
100,000
2-MEG
500

HORI. HOLD
100,000
2-MEG
500

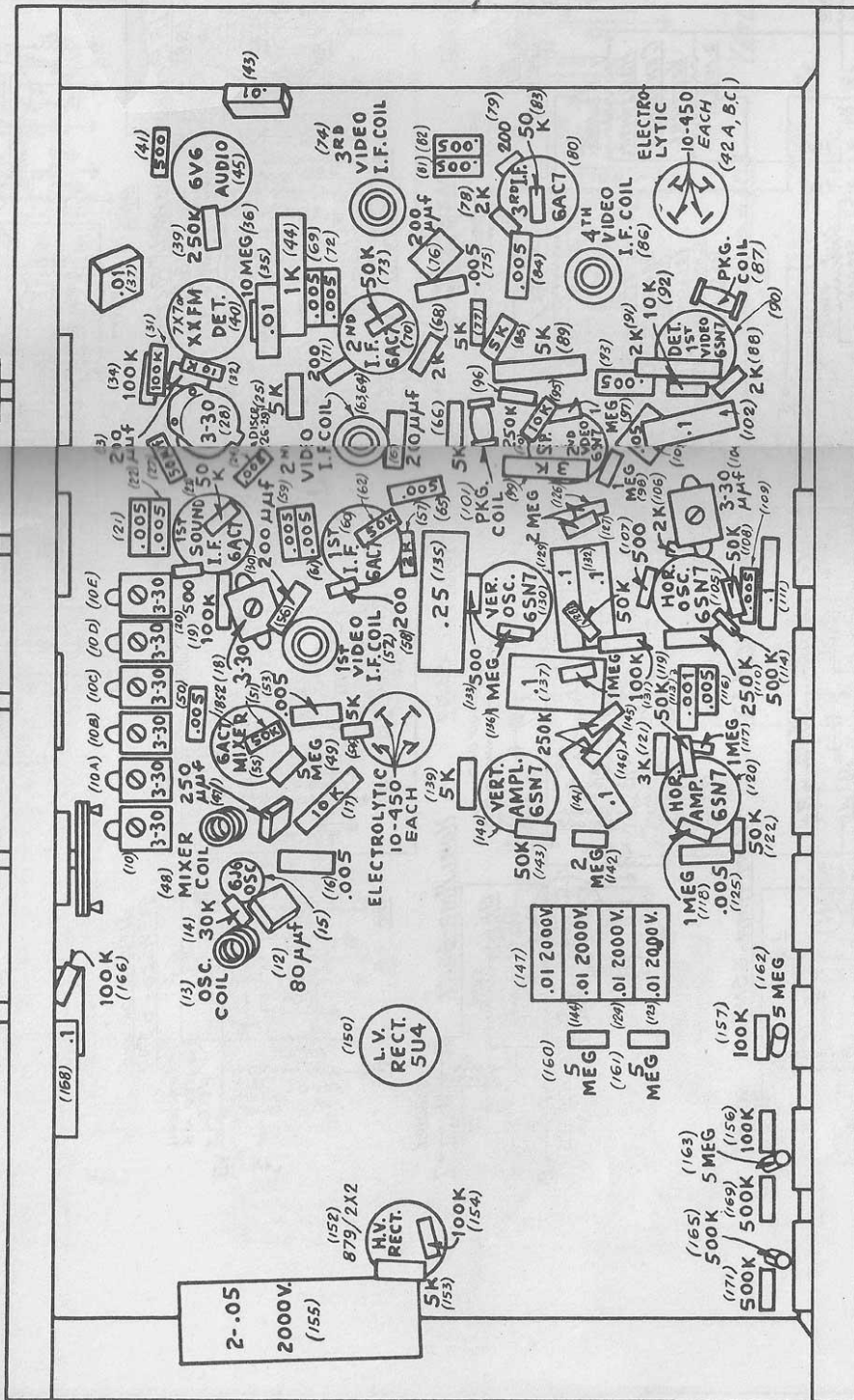
HORI. SIZE
500,000
2-MEG
500

VERT. SIZE
100,000
2-MEG
500

100,000
2-MEG
500

100,000
2-MEG
500

100K BRIGHTNESS & A.C. SWITCH (167)
FINE TUNER (11)
SELECTOR SWITCH (11A, B)
10K CONTRAST (94)
500K VOLUME (38)



BOTTOM VIEW

