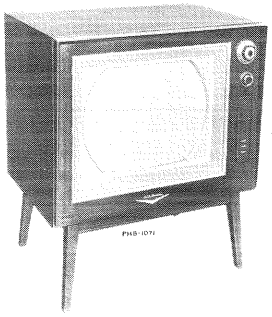
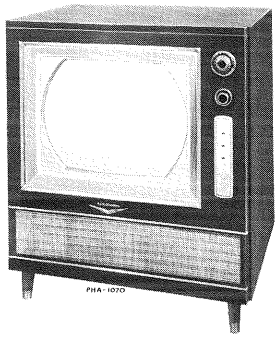
RCA VICTOR



Model 21-CT-661U
"Seville"
Mahogany, Blonde
Tropical Hardwood



Model 21-CT-662U
"Director"
Mahogany, Blonde
Tropical Hardwood

COLOR TELEVISION RECEIVERS

MODELS

21-CT-661U, 21-CT-662U

Chassis No. CTC4 or CTC4A

—Mfr. No. 274—

SERVICE DATA

—1955 No. T5—

PREPARED BY COMMERCIAL SERVICE SECTION
RCA SERVICE CO., INC.
CAMDEN 8, N. J.
FOR
RADIO CORPORATION OF AMERICA
RCA VICTOR TELEVISION DIVISION

GENERAL DESCRIPTION

Models 21-CT-661U and 21-CT-662U are "21 inch" color television receivers, capable of reception of either black and white or color programs. The receivers employ a shadow mask, three gun, directly viewed, 21 inch metal kinescope.

The receivers feature: 12 channel VHF coverage plus any UHF channels desired; intercarrier FM sound system; stabilized horizontal AFC; magnetic convergence and electrostatic focus; crystal controlled AFC color synchronization; high level color demodulation; automatic color control and a color "killer" circuit to disable the color channel during black and white reception.

A removable top panel is provided to facilitate servicing and adjustment. Dual loudspeakers are provided in Model 21-CT-662U for sound reproduction.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

PICTURE SIZE. Approx. 260 sq. ins. on a 21AXP22 Kinescope

TELEVISION R-F FREQUENCY RANGE

Any of 70 UHF channels.....470 mc. to 890 mc.
Any of 12 VHF channels, 54 mc. to 88 mc., 174 mc. to 216 mc.

INTERMEDIATE FREQUENCIES

Picture I-F Carrier Frequency.....45.75 mc.
Sound I-F Carrier Frequency.....41.25 mc.
Color Sub-Carrier Frequency.....(Nominal) 42.17 mc.

POWER RATING.....117 V. A.C., 60 Cy., 375 watts

AUDIO POWER OUTPUT RATING.....3 watts max.

SWEEP DEFLECTION.....Magnetic

FOCUS.....Electrostatic

CONVERGENCE.....Magnetic

ANTENNA INPUT IMPEDANCE

UHF—300 ohms balanced.
VHF—300 ohms balanced.

RCA TUBE COMPLEMENT

Tube Used	Function
(1) RCA 6AF4 or 6AF4A	UHF Oscillator
(2) RCA 6BQ7A	VHF R-F Amplifier UHF I-F Amplifier
(3) RCA 6X8	VHF R-F Oscillator & Mixer UHF I-F Amplifier
(4) RCA 6AZ8	1st Picture I-F Amp. & Vert. Osc.
(5) RCA 6AZ8	2nd Picture I-F Amp. & 2nd Sync. Amp.
(6) RCA 6AN8	3rd Picture I-F Amp. & 1st Sync. Amp. A 1N60 Crystal is used for the picture 2nd Detector.
(7) RCA 6CL6	1st Video Amplifier
(8) RCA 6CL6	2nd Video Amplifier
(9) RCA 6U8	Sound I-F Amp. & Noise Invertor
(10) RCA 6T8	Ratio Det. & 1st Audio Amp.
(11) RCA 6AQ5	Audio Output
(12) RCA 6AQ5	Vertical Output
(13) RCA 6SN7GT	Horiz. Sweep Osc. & Control
(14) RCA 6CB5	Horiz. Sweep Output
(15) RCA 6U8	AGC Amp. & Burst Keyer
(16) RCA 6BL4	Damper
(17) RCA 1X2B	Focus Rectifier
(18) RCA 3B2	High Voltage Rectifier
(19) RCA 6BK4	Shunt Regulator
(20) RCA 6AZ8	Killer & Band Pass Amplifier
(21) RCA 6AN8	Blanking Amp. & Reactance
(22) RCA 6AL5	Phase Detector
(23) RCA 6AZ8	3.58 MC Osc. & "B-Y" Amp.
(24) RCA 6AG7	Demodulator Driver
(25) RCA 12BH7	"G-Y" & "R-Y" Demodulators
(26) RCA 21AXP22	Kinescope

Two selenium rectifiers are used for Low Voltage rectification.

First Edition—First Printing 5-4-55

Printed in U. S. A.

ELECTRICAL AND MECHANICAL SPECIFICATIONS
(Continued)

SCANNING ..... Interlaced, 525 line
HORIZONTAL SCANNING FREQUENCY ..... 15,750 cps (Nominal)
VERTICAL SCANNING FREQUENCY ..... 60 cps (Nominal)
FRAME FREQUENCY (Picture Repetition Rate) .. 30 cps

OPERATING CONTROLS (FRONT)

VHF Channel Selector and UHF Changeover Switch ..... Dual Control Knobs
VHF Fine Tuning and UHF Tuning ..... Dual Control Knobs
Brightness, Sound Volume and On-Off Switch ..... Dual Control Knobs
Tone, Picture Vertical Hold ..... Dual Control (Knurled)
Contrast ..... Single Control Knob
Hue ..... Single Control Knob
Color ..... Single Control Knob
Horizontal (Freq.) ..... Single Control Knob

NON-OPERATING CONTROLS (FRONT)

Height ..... Screwdriver Adjustment
Vertical Linearity ..... Screwdriver Adjustment

NON-OPERATING CONTROLS (REAR)

Focus ..... Screwdriver Control
Killer Threshold ..... Screwdriver Control
Width ..... Screwdriver Control
Horizontal Centering ..... Screwdriver Control
Vertical Centering ..... Screwdriver Control
AGC, Noise Threshold ..... Dual Control

NON-OPERATING CONTROLS (TOP OF CHASSIS)

AFC Balance ..... Single Control
HV Adjustment ..... Single Control
Horizontal Drive ..... Single Control
Horizontal Tuning ..... Screwdriver Adjustment
Purifying ..... Magnet Adjustment
Magnetic Field Equalizing ..... (6) Magnet Adjustments
Blue Beam Positioning ..... Magnet Adjustment
Convergence Yoke ..... (3) Magnet Adjustments
FM Trap ..... Screwdriver Adjustment

CONVERGENCE CONTROLS

Red Vertical Amplitude, Red Vertical Tilt ..... Dual Control
Green Vertical Amplitude, Green Vertical Tilt ..... Dual Control
Blue Vertical Amplitude, Blue Vertical Tilt ..... Dual Control
Red Horizontal Amplitude ..... Single Control
Blue Horizontal Amplitude ..... Single Control
Green Horizontal Amplitude ..... Single Control
Red Horizontal Shape ..... Screwdriver Adjustment
Green Horizontal Shape ..... Screwdriver Adjustment
Blue Horizontal Shape ..... Screwdriver Adjustment

KINESCOPE SET-UP CONTROLS

Red Screen ..... Single Control
Green Screen ..... Single Control
Blue Screen ..... Single Control
Green Background ..... Single Control
Blue Background ..... Single Control

HIGH VOLTAGE WARNING

OPERATION OF THIS RECEIVER OUTSIDE THE CABINET OR WITH THE COVERS REMOVED, INVOLVES A SHOCK HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THE RECEIVER SHOULD NOT BE ATTEMPTED BY ANYONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY WHEN WORKING ON HIGH VOLTAGE EQUIPMENT. DO NOT OPERATE THE RECEIVER WITH THE HIGH VOLTAGE COMPARTMENT COVER OPENED. BEFORE TURNING THE RECEIVER ON, INSURE THAT THE GROUND LEAD BETWEEN THE CHASSIS GROUNDING STRIP AND THE FRONT TRIM AND THE LEAD BETWEEN THE TRIM AND THE BOTTOM RETAINING ROD ARE FASTENED AND MAKING CONTACT. BE SURE THE GROUND LEAD TO THE TOP OF THE FRONT TRIM ASSEMBLY IS IN PLACE.

KINESCOPE HANDLING PRECAUTIONS

DO NOT REMOVE THE RECEIVER CHASSIS, INSTALL, REMOVE OR HANDLE THE KINESCOPE IN ANY MANNER UNLESS SHATTERPROOF GOGGLES ARE WORN. PEOPLE NOT SO EQUIPPED SHOULD BE KEPT AWAY WHILE HANDLING KINESCOPES. KEEP THE KINESCOPE AWAY FROM THE BODY WHILE HANDLING.

The kinescope bulb encloses a high vacuum and, due to its large surface area, is subjected to considerable air pressure. For this reason, the kinescope must be handled with more care than ordinary receiving tubes.

The large end of the kinescope bulb—particularly that part at the rim of the viewing surface—must not be struck, scratched or subjected to more than moderate pressure at any time. During service if the tube sticks or fails to slip smoothly into its socket, or deflecting yoke, investigate and remove the cause of the trouble. Do not force the tube. All RCA replacement kinescopes are shipped in special cartons and should be left in the cartons until ready for installation in the receiver.

The following adjustments are necessary when turning the receiver on for the first time.

BLACK and WHITE RECEPTION

1. Turn the COLOR control fully counter-clockwise and turn the receiver "ON". Advance the SOUND VOLUME control to approximately mid-position.

2. Set the VHF CHANNEL SELECTOR and UHF CHANGE-OVER switch to the desired VHF channel, or to UHF position, whichever applies. UHF channel selection is made by setting the TUNING control to the desired UHF channel with the CHANNEL switch at UHF position.

3. Advance the CONTRAST control approximately one-quarter turn.

4. Turn the BRIGHTNESS control fully counterclockwise then clockwise until a light pattern appears on the screen.

5. Adjust the FINE TUNING control for best picture quality and the SOUND VOLUME for suitable volume.

6. Adjust the VERTICAL HOLD control until the pattern stops vertical movement.

7. Adjust the HORIZONTAL HOLD control until a picture is obtained and centered.

8. Turn the BRIGHTNESS control for normal screen brightness.

9. Adjust the CONTRAST control for suitable picture contrast.

10. Adjust the TONE control for the desired tonal quality.

11. In switching from one channel to another, it may be necessary to repeat steps numbers 5 and 9.

12. When the receiver is turned on again after an idle period, it should not be necessary to repeat the adjustments if the position of the controls have not been changed. If any adjustment is necessary, steps 5 and 9 are generally sufficient.

COLOR RECEPTION

1. Adjust the receiver for a black and white picture as outlined above, with the fine tuning control advanced to its most clockwise position where most detailed picture is obtained.

2. Set the CHANNEL SELECTOR to the desired channel broadcasting a color program.

3. Advance the COLOR control approximately one-quarter turn from its maximum counter-clockwise position.

4. Carefully advance the VHF FINE TUNING and UHF TUNING control clockwise until the picture just begins to disappear, then counterclockwise, slowly to the position where sound bars just disappear from the picture and color is in the picture.

5. Adjust the COLOR control for the desired saturation or strength of color.

6. Adjust the HUE control for hue quality of the picture (redness, blueness, etc.)—to achieve the most pleasing flesh tones or color of some familiar object.

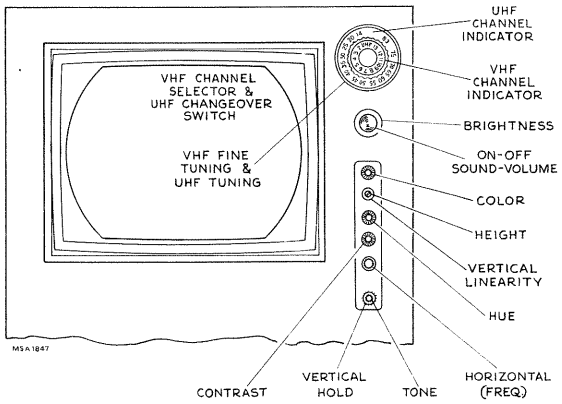


Figure 1—Operating Controls

INSTALLATION INSTRUCTIONS

UNPACKING.—These receivers are shipped complete in cardboard cartons. The kinescope is shipped in place in the receiver.

Take the receiver out of the carton and remove all packing material. Remove the skid from the cabinet.

Make sure that all tubes are in place and are firmly seated in their sockets.

Check to see that the kinescope high voltage connector is in place.

CAUTION: Removal of the rear cabinet screen actuates the H.V. interlock, grounding out the high voltage capacitor. Do not turn on the receiver with the interlock plug (on rear screen) removed. To do so will result in failure of the H.V. fuse F101.

Plug the power cord into the 115 volt a-c power source and turn the receiver power switch to the "on" position.

Connect the antenna transmission line to the receiver.

Adjust the receiver, as outlined in the "OPERATING INSTRUCTIONS", for a black and white picture.

With the Horizontal Oscillator and AGC system operating properly, it should be possible to sync the picture at this point. However, if the AGC control or Noise Threshold control is misadjusted, and the receiver is overloading, it may be impossible to sync the picture.

If the receiver is overloading it will be necessary to adjust the AGC and Noise Threshold controls.

Turn the Noise Threshold control R186B, on the chassis rear apron, fully counter-clockwise.

Select the channel with the strongest signal and turn the AGC control counter-clockwise until the receiver operates normally and the picture can be synchronized. (Refer to figure 2 for adjustment location.)

Switch the receiver to the weakest signal to be received.

Turn the Noise Threshold control R186B clockwise until the best signal-to-noise ratio is obtained.

Select the strongest signal once again and check that adjustment of the noise threshold control, did not cause overload. The noise threshold control should be set for best signal-to-noise without causing overload on strong signals.

At this point it is necessary to check the horizontal oscillator and the conventional adjustments of focus, height, vertical linearity, horizontal linearity, width, drive, and electrical centering.

CHECK OF HORIZONTAL OSCILLATOR ALIGNMENT.—Turn the horizontal hold control to the extreme counter-clockwise position. The picture should be out of sync with multiple bars slanting to the right.

Turn the control clockwise slowly. The number of diagonal black bars will be gradually reduced and when only 1 to 3 bars sloping downward to the right are obtained, the picture will pull into sync upon slight additional clockwise rotation of the control. The picture should remain in sync for a minimum of three additional clockwise turns of the control. At the extreme clockwise position, the picture should be out of sync, with multiple bars slanting to the left.

Rotate the control counter-clockwise to the pull-in point. Continue counter-clockwise rotation for two full turns from pull-in. This will be the proper setting of the control.

When the receiver passes the above checks and the picture is normal and stable, the horizontal oscillator is properly aligned.

ADJUSTMENT OF HORIZONTAL OSCILLATOR.—If in the above check the receiver failed to hold sync for a minimum of three full turns and the AGC system is in proper adjustment it will be necessary to adjust the Horizontal Oscillator by the method outlined in the alignment procedure on page 16.

CENTERING ADJUSTMENT.—Centering is accomplished by adjustment of the two electrical centering controls located on the rear of the chassis as shown in figure 2.

Adjust the vertical centering control R267 and the horizontal centering control R154 to center the picture within the mask of the kinescope. If the picture does not fully cover the masked area of the kinescope, adjust the positioning for equal distribution of blank area at top and bottom and at each side.

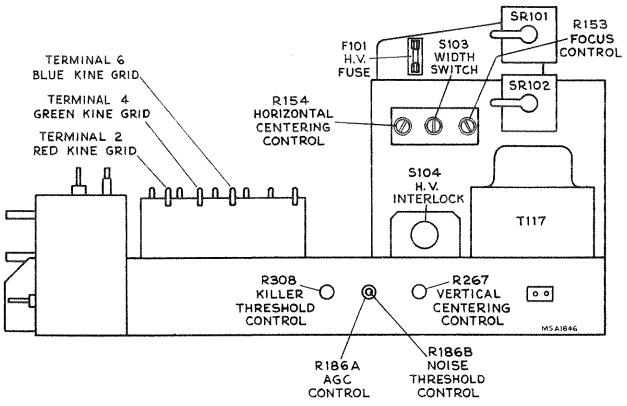


Figure 2—Rear Chassis Adjustments

WIDTH, DRIVE AND HORIZONTAL TUNING ADJUSTMENTS.—Adjust the Width Switch S103 on the rear of the HV compartment, as shown in figure 2, to overscan the masking area by approximately three-quarters of an inch at each side.

Adjustment of the horizontal drive and tuning controls affect the operation of the HV section of the receiver and should not be attempted at this point.

If it is impossible to fill the mask by the above width adjustment, it will be necessary to follow the procedure outlined under HV & HORIZONTAL DEFLECTION ADJUSTMENT on page 16 of the "ALIGNMENT PROCEDURE."

HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS.—Adjust the height control R176A and the Vertical Linearity Control R176B (controls under cabinet front cover—see figure 1), until the picture or test pattern is symmetrical from top to bottom. Make the final adjustment to overscan the mask by one-half inch at both top and bottom. Recheck the horizontal and vertical centering for correct positioning of the picture with respect to the mask.

FOCUS.—Adjust the focus control R247 on the rear of the HV compartment for maximum overall definition of fine picture detail.

CHECK OF VHF R-F OSCILLATOR ADJUSTMENTS.—Tune in all available stations to see that the receiver r-f oscillator is adjusted to the proper frequency on all channels. If adjustments are required, these should be made by the method outlined in the alignment procedure on page 14. The adjustments for channels 2 through 12 are available from the front of the cabinet by removing the knobs and station selector escutcheon as shown in figure 3. Adjustment for channel 13 is on top of the chassis. The oscillator for the UHF section of the tuner should be adjusted by the method outlined on page 15 under Alignment Procedure.

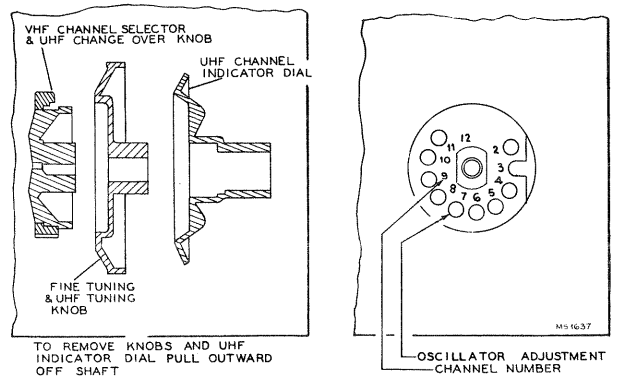


Figure 3—VHF R-F Oscillator Adjustment

FM TRAP ADJUSTMENT.—In some instances interference may be encountered from a strong FM station signal. A trap is provided to eliminate this type of interference. To adjust the trap tune in the station on which the interference is observed and adjust the FM trap for minimum interference in the picture.

CAUTION.—In some receivers, the FM trap will tune down into channel 6 or even into channel 5. Needless to say, such an adjustment will cause greatly reduced sensitivity on these channels. If channels 5 or 6 are to be received, check to make sure that it does not affect sensitivity on these two channels.

Replace the cabinet top panel. Make sure that the screws holding it are up tight, otherwise it may vibrate when the receiver is operated at high volume.

KINESCOPE REPLACEMENT

KINESCOPE HANDLING PRECAUTION.—Do not open the kinescope carton, install, remove, or handle the kinescope in any manner, unless shatterproof goggles are worn. People not so equipped should be kept away while handling the kinescope.

REMOVAL OF KINESCOPE.—Take off the front control knobs by pulling the knobs outward. Remove the rear screen of the cabinet and remove the cabinet top by taking out the three bolts holding the top in place. Slide the top to the rear approximately one inch and lift off. Disconnect the H.V. Ultor anode connector. Remove the yoke plug and unplug the speaker(s). Remove the plug from the convergence yoke assembly and disconnect the kinescope socket.

The main chassis should be out of the cabinet for removal or installation of the kinescope. Take out the bolts holding the chassis and slide the chassis out from the rear. The kinescope should be installed with the cabinet resting on its face. Lay the cabinet on its face with a heavy pad used to protect the cabinet front.

Remove the blue beam positioning magnet and the purifying magnet assembly by sliding them off the kinescope neck. Slide the convergence yoke assembly off the end of the kinescope neck. Refer to figure 7.

Loosen the three retaining rod thumb screws and disengage the rods from the retaining ring. Then slide the retaining ring and yoke assembly off the kinescope neck. Unclip the ground lead to the front mask trim and loosen the screw holding the field equalizing magnet assembly. Carefully slide the assembly off from around the front end of the kinescope insulator and remove.

Lift off the insulating shield and anode connector. Grasp the kinescope at the rear flange, and lift directly upward out of the front mask, and place the kinescope face downward on a soft pad. Remove the rubber ring cushion from around the front flange of the kinescope.

INSTALLATION OF KINESCOPE.—Take the kinescope from its carton, observing the precautions in handling as noted previously. Place the rubber ring cushion around the front flange of the kinescope. Grasp the kinescope by the inner flange and place it into the front mask with the blue gun facing you. The position of the blue gun may be determined from the numbers moulded into the kinescope base. The blue gun is located next to pin 12. The blue beam positioning pole piece attached to the blue gun is another means of identification. (Refer to figure 4.)

Check to be sure the ultor anode connector is seated where it passes through the aperture in the side of the H.V. Insulator. Install the insulator over the kinescope with the anode lead protruding at the "eleven o'clock" position.

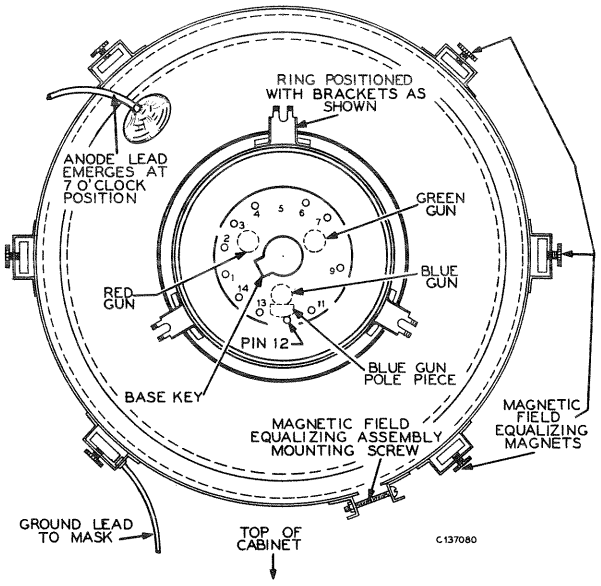


Figure 4—Kinescope Assembly

Place the magnetic field equalizing magnet assembly over the front of the bell between the two flanges with the magnets at each side of the kinescope as shown in figure 4. Fasten the ground lead clip to the magnet assembly.

Slide the yoke and yoke shield assembly over the kinescope neck with the wing nuts at the sides. The yoke leads should be located at the bottom. Slip the retaining rods into the slots in the yoke shield and tighten just finger tight. The assembly should appear as shown in figure 5. The receiver may now be returned to an upright position.

Slide the convergence coil and magnet assembly forward over the kinescope neck. Center the magnets, from front to rear, over the pole pieces at the front end of the kinescope guns. The opening between the two magnets should be over the opening between the pole pieces. Refer to figure 6. The blue coil must be positioned over the blue gun. The proper coil may be identified by the colored strip which is fastened to the rear of each coil. Improper positioning will result in inability to properly converge the kinescope beams. Insert the convergence yoke plug P102B in its socket at the convergence section of the chassis. Place the purifying magnet over the kinescope neck with the small tabs toward the bell

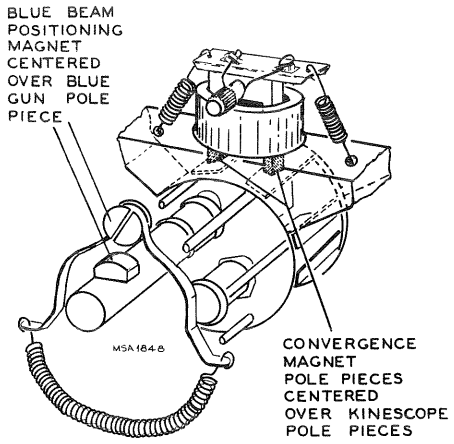


Figure 6—Location of Convergence and Blue Beam Positioning Magnets

of the kinescope as shown in figure 7. Position the assembly approximately ¼ inch behind the converging coil and magnet assembly. Place the blue beam positioning magnet on the kinescope neck with the plastic insert directly over the blue beam positioning pole piece. See figure 6. Replace the chassis in the cabinet and bolt in position. Connect the ultor anode lead, the speaker plug, the yoke plug and the kinescope socket.

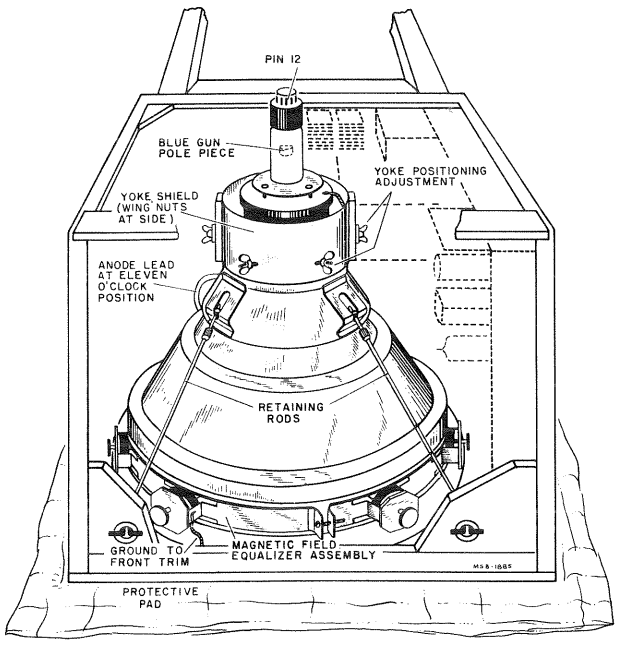


Figure 5—Kinescope Installation

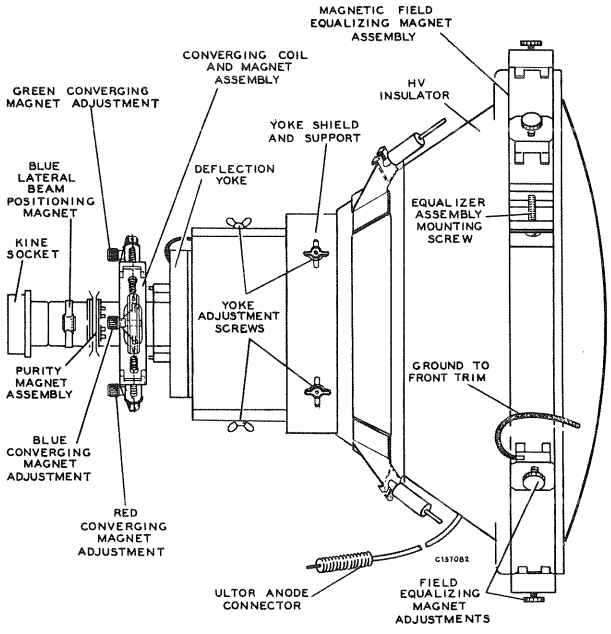


Figure 7—Kinescope Adjustments and Components

COMPLETE SET-UP PROCEDURE

Prior to making any picture adjustments, it is essential to have 25,000 volts applied to the ultor anode of the kinescope (see HIGH VOLTAGE & HORIZONTAL DEFLECTION ADJUSTMENT under ALIGNMENT PROCEDURE on page 16). A conventional black and white test pattern, if available, is useful for making initial adjustments. A dot or crosshatch pattern should be provided for convergence adjustments.

INITIAL ADJUSTMENTS.—Adjust the receiver, as outlined in the "OPERATING INSTRUCTIONS," for a black and white picture.

If the Horizontal Oscillator and AGC system are operating properly, it should be possible to sync the picture at this point. However, if the AGC control is misadjusted, and the receiver is overloading, it may be impossible to sync the picture.

If the receiver is overloading it will be necessary to adjust the AGC and/or Noise Threshold controls. Turn the Noise Threshold control, on the chassis rear apron, fully counter-clockwise. Select the channel with the strongest signal and turn the AGC control counter-clockwise until the receiver operates normally and the picture can be synchronized. (Refer to figure 2 for adjustment location.)

Switch the receiver to the weakest signal to be received.

Turn the Noise Threshold control R186B clockwise until the best signal-to-noise ratio is obtained.

Select the strongest signal once again and check, that adjustment of the Noise Threshold control, did not cause overload. The noise threshold control should be set for best signal-to-noise without causing overload on strong signals.

At this point it is necessary to check the horizontal oscillator and the conventional adjustments of height, vertical linearity, width, focus, and electrical centering.

PRELIMINARY CONVERGENCE ADJUSTMENT.—The dot signal generator should be connected to the receiver to provide a dot pattern on the kinescope for making convergence adjustments.

To do this, clip the "horizontal lead" from the dot generator to the insulation of the red lead of the deflection yoke cable.

Clip the "vertical lead" from the dot generator to the insulation of the lead to pin 4 of the kinescope socket.

For generators with internal vertical sync omit this connection.

Connect the "ground lead" to the receiver chassis and the "output lead" to the Delay Line TD101, at the end making a junction with L114.

Set the receiver to obtain a signal from some channel. This will provide sync pulses to the dot generator.

NOTE.—Dot generators which provide an RF output should be connected to the antenna terminals of the receiver.

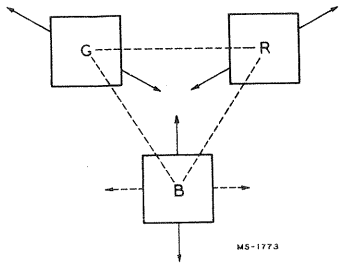


Figure 8—Dot Movement Pattern

Preset the red, green and blue horizontal and vertical amplitude controls to minimum, fully counter-clockwise. Refer to figure 12 for control locations. Preset the red, green and blue vertical tilt controls to mid-range.

Adjust the three converging magnet adjustments, shown in figure 7, and the blue beam-positioning magnet to produce a white dot in the center of the screen. The direction of movement of the dots is shown in figure 8. Lateral movement of the blue dot is accomplished by rotation of the plastic magnet holder of the blue beam-positioning magnet shown in figures 6 and 7.

Set the dot generator to "stand-by" position.

COLOR PURITY ADJUSTMENTS.—Set all the magnets on the field equalizing assembly at their maximum distance from the kinescope. These magnets have two adjustments. They are moved toward or away from the kinescope by slipping the shaft on its threads, and they may also be rotated on the threads with the adjustment knobs, see figure 4.

Set the contrast control fully counter-clockwise and the brightness control fully clockwise.

Set the red screen control to fully clockwise and the green and blue screen controls fully counter-clockwise.

Rotate one or both of the rings of the purifying magnet, by the tabs, or rotate the entire assembly, to achieve minimum color contamination of the red field. The yoke should also be adjusted by moving forward or backward on the kinescope neck. Loosen the wing-nut at each side of the yoke and position the yoke for minimum color contamination of the red field.

NOTE: A microscope may be employed to observe the individual dot illumination. Adjustments should be made to illuminate the entire surface of each dot. Check all areas of the screen for uniform excitation of the red dots.

The kinescope and associated components should be subjected to a strong magnetic field at this point. Using the degaussing coil, slowly move the coil around the kinescope, the sides and front of the receiver and very slowly withdraw to about six feet before disconnecting the coil. Minimum contamination should result from the above adjustments and the degaussing procedure.

SCREEN ADJUSTMENTS.—Advance the green and blue screen controls and then adjust all three screen controls to produce a high-level white screen. Color contamination may be noted around the edges of the screen.

Adjust the individual field equalizing magnets adjacent to the area of contamination to produce the most uniform white field over the entire screen.

Recheck color purity on all three color screens. Where adjustment of the equalizing magnets disrupts color purity to an appreciable degree, a compromise setting of the magnets must be made.

NOTE: Relocation of the receiver may disrupt the purity adjustments, if the receiver passes through the influence of stray magnetic fields. Purity should be checked at the location in which the instrument is to be operated.

KINESCOPE TEMPERATURE & BACKGROUND ADJUSTMENTS.—Tune in a normal black and white picture.

Set the blue and green background controls to the center of their ranges. Set the brightness control fully clockwise.

Turn the contrast control fully counter-clockwise.

Adjust the three screen controls to produce a high-level gray screen. (The correct setting is for an 8200° Kelvin gray screen.)

Advance the contrast control and observe the picture. One or more colors should predominate in the low-light areas.

Reduce this color(s) with the proper screen control and restore the gray screen with the background controls.

Continue the above adjustments until proper tracking is achieved between low-light and high-light areas, as the brightness control is adjusted through its range.

STATIC CONVERGENCE ADJUSTMENTS

A dot pattern (or cross-hatch pattern if desired) must be used for convergence adjustments. Turn the dot generator back on. Static convergence adjustments are performed with the magnets of the convergence coil and magnet assembly and the blue beam-positioning magnet.

Recheck the dot pattern for white dots in the center of the screen. If necessary, readjust the four magnet adjustments to again produce this condition. At this point the dot pattern should appear as shown in figure 9. The center dots should be converged, with mis-convergence at the sides and at the top and bottom of the screen. The dot triangles may not necessarily be equilateral triangles as shown in the illustration but should produce approximately the pattern shown.

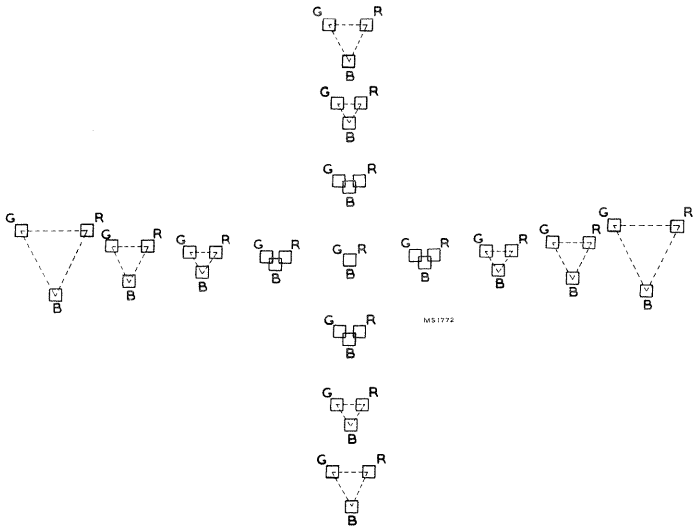


Figure 9—Center Static Convergence Pattern

DYNAMIC CONVERGENCE ADJUSTMENTS

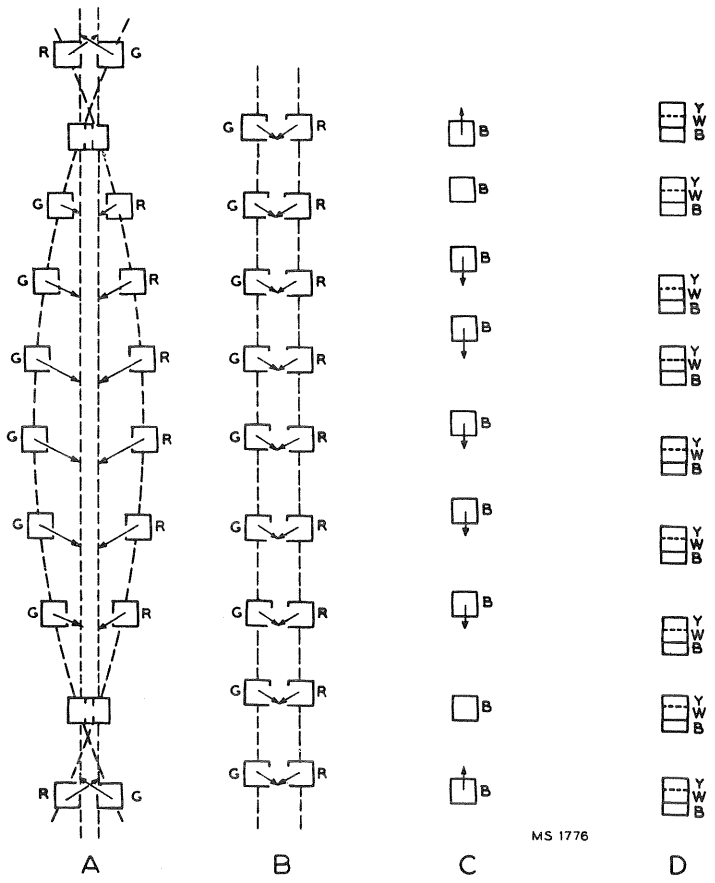


Figure 10—Vertical Dynamic Convergence Patterns

VERTICAL CONVERGENCE.—Vertical dynamic convergence should be performed before horizontal convergence.

Referring to the vertical row of dots nearest the center of the screen, turn the red vertical amplitude control fully clockwise and adjust the red vertical tilt control for maximum displacement of the red dots, from the cyan dots, at the center of the screen.

Turn the green vertical amplitude control fully clockwise and adjust the green vertical tilt control for maximum displacement of the green dots at the center of the screen. The direction of center displacement should be opposite to red. Shunt the blue grid of the kinescope at the chassis rear apron through a 100,000 ohm resistor to ground, to facilitate adjustment of the red and green dot patterns. The center row of vertical dots will appear as in figure 10A. Adjust the red and green vertical amplitude and tilt controls to produce straight vertical lines of red and green dots equally displaced from each other along the entire vertical center line as in figure 10B. Converge the two rows of dots, using the red and green convergence magnet adjustments to produce a single vertical row of yellow dots. Direction of movement of the red and green dots is indicated in figure 10B. Should red and green displacement appear at the top and/or bottom of the row of dots, readjustment of red and green vertical amplitude and tilt controls must be made to produce an entire vertical row of yellow dots.

Remove the shunt from the blue grid and set the blue vertical amplitude control fully clockwise. Alternately adjust the blue vertical tilt and amplitude controls until the displacement of the blue dots are uniform with respect to the yellow dots, along the entire vertical center line. Direction of movement of the blue dots is shown in figure 10C. Using the blue convergence magnet and/or the blue beam positioning magnet adjustments, the row of blue dots should now be moved to make the blue dots fall on the row of yellow dots forming a single vertical row of white dots, see figure 10D.

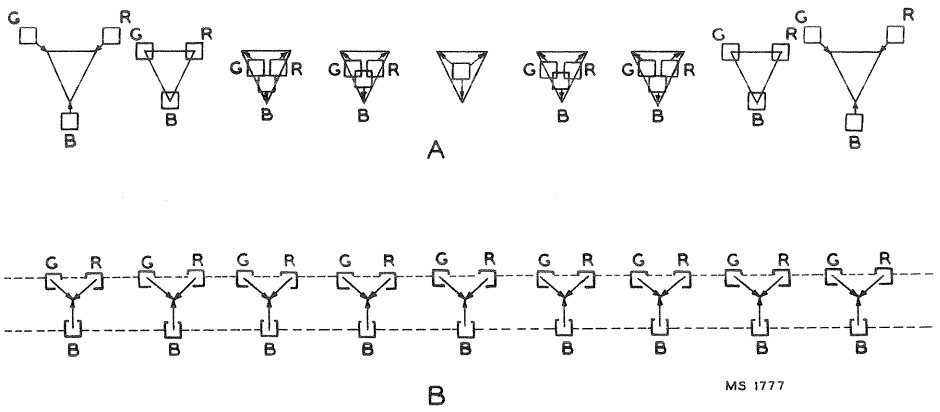


Figure 11—Horizontal Dynamic Convergence Patterns

HORIZONTAL CONVERGENCE.—The procedure for horizontal convergence is approximately the same as that used for vertical convergence. The horizontal row of dots nearest the center, however, is used for reference. Figure 9 shows the horizontal displacement at this point.

Adjustment of the horizontal convergence controls will produce movement of the dots as indicated in figure 11A.

Turn the blue horizontal amplitude control fully clockwise. Adjust the blue horizontal phasing control to produce maximum downward displacement of the blue dots at the center of the screen. Alternately adjust the blue horizontal phasing and amplitude controls to produce a straight horizontal line of blue dots across the center of the screen.

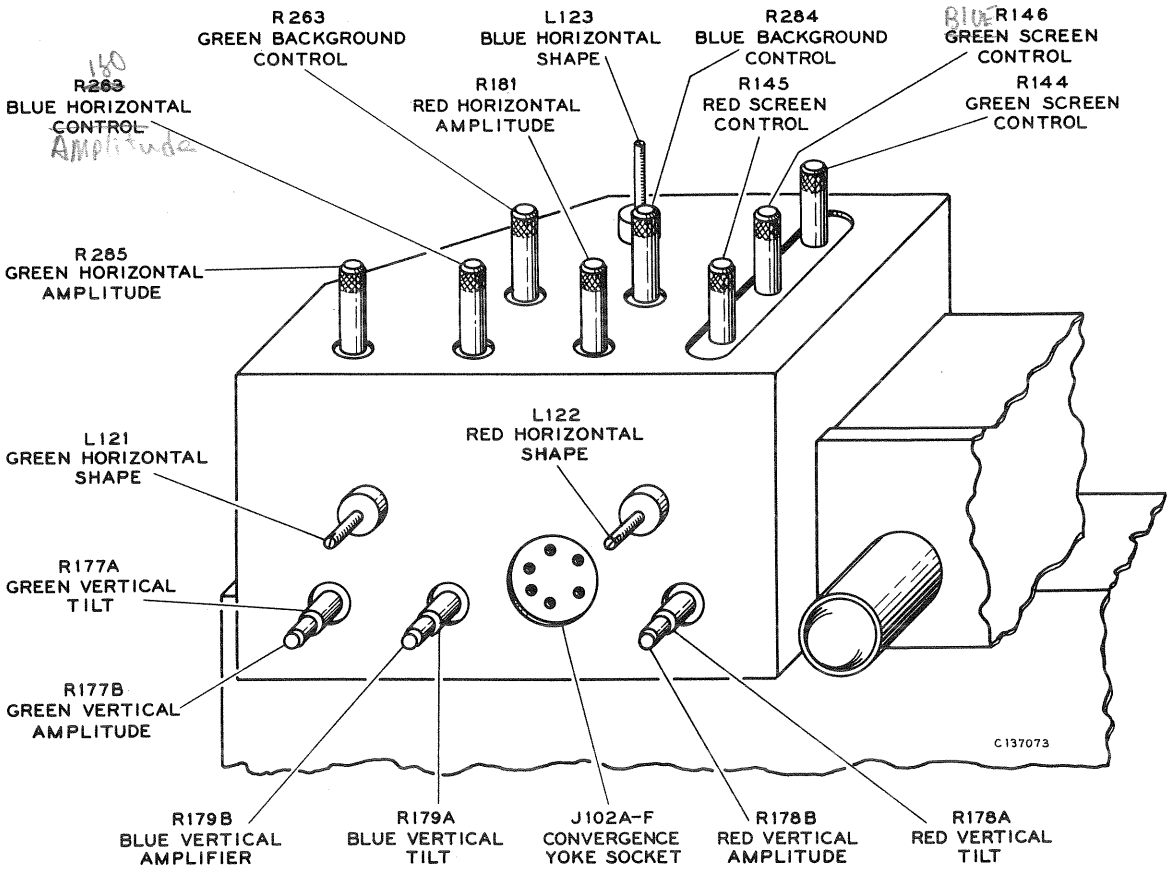


Figure 12—Convergence Section Adjustments

Shunt the red grid of the kinescope at the chassis rear apron through a 100,000 ohm resistor. Alternately adjust the green horizontal amplitude and phasing controls to produce uniform displacement of the entire center line of green dots with respect to the center line of blue dots.

Shunt the blue kinescope grid at the chassis rear apron, and remove the shunt from the red grid of the kinescope. Adjust the red horizontal amplitude and phasing controls to produce uniform displacement of the center line of red dots with respect to the center line of green dots. Remove the shunt from the blue kinescope grid. The dot pattern should appear as in figure 11B. The dots must now be converged with the convergence magnet adjustments to form a single line of white dots. To do this shunt the blue grid of the kinescope once more.

Adjust the green and red convergence magnet adjustments to converge the green and red dots along the horizontal center line producing a single center line of yellow dots. Remove the shunt from the blue kinescope grid. Adjust the blue convergence magnet and blue beam positioning magnet adjustments to move the blue dots onto the yellow dots, producing white dots. The dot pattern should now show maximum convergence over the entire screen.

KINESCOPE AND SAFETY GLASS CLEANING.—The front safety glass may be removed to allow for cleaning of the kinescope faceplate and the safety glass.

To do this, remove the rear screen and the top panel of the receiver. There are a number of flat springs holding the cabinet front metal trim to the plastic kinescope mask.

Reach over the top front of the receiver and press in on each spring at the open end. Slide the spring out of the slot provided. The front trim and safety glass should be held in position with the other hand to prevent its falling outward when removing the springs.

Remove the metal trim and the safety glass.

The kinescope faceplate and the safety glass should only be cleaned with a soft cloth and "Windex" or similar cleaning agent.

Replace the metal trim, safety glass, cabinet top and rear screen.

RECEIVER LOCATION.—The owner should be advised of the importance of placing the receiver in the proper location in the room.

The location should be chosen—

—Away from bright windows and so that no bright light will fall directly on the screen. (Some illumination in the room is desirable, however.)

—To give easy access for operation and comfortable viewing.

—To permit convenient connection to the antenna.

—Convenient to an electrical outlet.

—To allow adequate ventilation.

TEST EQUIPMENT.—To properly service these receivers, the following test equipment, or its equivalent, may be employed.

VHF Sweep Generator meeting the following requirements:

(a) Frequency Ranges
0 to 5 mc. Video Sweep
35 to 90 mc., 1 mc. to 12 mc. sweep width
170 to 225 mc., 12 mc. sweep width

(b) Output adjustable with at least .1 volt maximum.

(c) Output constant on all ranges.

(d) "Flat" output on all attenuator positions.

(RCA WR-59C or WR-58B Modified for Video Sweep)

VHF Signal Generator to provide the following frequencies with crystal accuracy:

(a) Intermediate frequencies
4.5 mc., 40.7 mc., 41.25 mc., 41.65 mc., 42.17 mc., 43.5 mc., 45.75 mc., 47.25 mc.

(b) Radio frequencies

Channel Number	Picture Carrier Freq. Mc.	Sound Carrier Freq. Mc.	Receiver R-F Osc. Freq. Mc.
2	55.25	59.75	101
3	61.25	65.75	107
4	67.25	71.75	113
5	77.25	81.75	123
6	83.25	87.75	129
7	175.25	179.75	221
8	181.25	185.75	227
9	187.25	191.75	233
10	193.25	197.75	239
11	199.25	203.75	245
12	205.25	209.75	251
13	211.25	215.75	257

(c) Output of these ranges should be adjustable and at least .1 volt maximum.

(RCA WR-39C or WR-89A Crystal Calibrator)

VHF Heterodyne Frequency Meter with crystal calibrator if the signal generator is not crystal controlled.

UHF Sweep Generator with a frequency range of 470 mc. to 890 mc. RCA Types WR-40A, WR-41A or WR-86A or their equivalent.

UHF Signal Generator to provide the following frequencies with crystal accuracy if RCA Type WR-41A or WR-86A is used.

Channel Number	Picture Carrier Freq. Mc.	Sound Carrier Freq. Mc.	Receiver R-F Osc. Freq. Mc.
14	471.25	475.75	517
15	477.25	481.75	523
16	483.25	487.75	529
17	489.25	493.75	535
18	495.25	499.75	541
19	501.25	505.75	547
20	507.25	511.75	553
21	513.25	517.75	559
22	519.25	523.75	565
23	525.25	529.75	571
24	531.25	535.75	577
25	537.25	541.75	583
26	543.25	547.75	589
27	549.25	553.75	595
28	555.25	559.75	601
29	561.25	565.75	607
30	567.25	571.75	613
31	573.25	577.75	619
32	579.25	583.75	625
33	585.25	589.75	631
34	591.25	595.75	637
35	597.25	601.75	643
36	603.25	607.75	649
37	609.25	613.75	655
38	615.25	619.75	661
39	621.25	625.75	667
40	627.25	631.75	673
41	633.25	637.75	679
42	639.25	643.75	685
43	645.25	649.75	691
44	651.25	655.75	697
45	657.25	661.75	703
46	663.25	667.75	709
47	669.25	673.75	715
48	675.25	679.75	721
49	681.25	685.75	727
50	687.25	691.75	733
51	693.25	697.75	739
52	699.25	703.75	745
53	705.25	709.75	751
54	711.25	715.75	757
55	717.25	721.75	763
56	723.25	727.75	769
57	729.25	733.75	775
58	735.25	739.75	781
59	741.25	745.75	787
60	747.25	751.75	793
61	753.25	757.75	799
62	759.25	763.75	805
63	765.25	769.75	811
64	771.25	775.75	817
65	777.25	781.75	823
66	783.25	787.75	829
67	789.25	793.75	835
68	795.25	799.75	841
69	801.25	805.75	847
70	807.25	811.75	853
71	813.25	817.75	859
72	819.25	823.75	865
73	825.25	829.75	871
74	831.25	835.75	877
75	837.25	841.75	883
76	843.25	847.75	889
77	849.25	853.75	895
78	855.25	859.75	901
79	861.25	865.75	907
80	867.25	871.75	913
81	873.25	877.75	919
82	879.25	883.75	925
83	885.25	889.75	931

Absorption Type Video Marker Box.—Marker Box to provide the following frequencies and adjusted to crystal accuracy on these frequencies: 0.5 mc.; 1.5 mc.; 2.5 mc.; 3.58 mc. and 4.5 mc. RCA WG-295 or equivalent.

(Used with RCA WR-59C Generator)

Cathode Ray Oscilloscope.—RCA WO-56A or WO-88A or equivalent. An oscilloscope preamplifier with a gain of approximately 500 times is required for use with the oscilloscope, as indicated in the alignment procedure.

Color Bar Generator.—RCA WR-61A, or equivalent.

Degaussing Coil.—Approximately 425 turns of #20 enameled wire 12 inches in diameter. Connected across 117 volt 60 cycle AC source.

Dot Generator.—RCA WR-36A or equivalent.

Electronic Voltmeter.—A voltmeter with a 1.5 volt DC scale is required. RCA Senior or Master "VoltOhmyst" (with Diode Probe RCA WG-264 and HV Probe RCA WG-289 with WG-206) or its equivalent.

I-F Load and Detector Block.—Refer to figure 15 under Alignment Procedure.

Microscope.—A microscope of approximately 12 power for phosphor dot observation.

Milliameter.—A meter with a 0-500 M.A. range is required for HV measurement.

Television Picture Carrier Signal Generator (with provision for Wide Band Modulation).—i.e. RCA WR-39C Crystal Calibrator modulated by RCA WR-59C Sweep Generator.

Video Sweep Generator.—Sweep Generator with a range of 0 to 5 mc. with markers—RCA WR-59C and Marker Box listed above, or equivalent.

VHF Attenuator Pad.—Refer to figure 20 under Alignment Procedure.

Wide Band Oscilloscope.—RCA WO-78A or equivalent.

The Horizontal Deflection Circuit should be disabled by removing fuse F101 when performing the alignment of the Sound I-F, Picture R-F and I-F, and Video sections of the receiver. This is done to prevent horizontal pulse interference on the oscilloscope.

A 1500 ohm-watt resistor must be connected from the +385 volt buss to the −20 volt buss.

SOUND I-F ALIGNMENT

Connect the VHF signal generator to pin 2 of V110, the 1ST VIDEO AMPLIFIER, and to ground. With a short jumper, ground the grid of the 3RD PICTURE I-F AMPLIFIER, pin 8 of V109A.

Connect the "VoltOhmyst" to the junction of R104 and R106, near pin 2 of V102A RATIO DETECTOR, and to ground.

Set the signal generator to 4.5 mc. with maximum output and adjust T102 (top) RATIO DETECTOR TRANSFORMER for maximum indication on the "VoltOhmyst".

Adjust the signal level from the signal generator for −15 volts on the "VoltOhmyst" when finally peaked. This is approximately the operating level of the ratio detector for average signals.

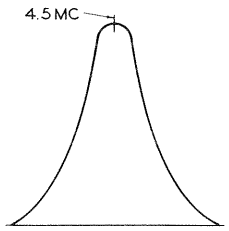


Figure 13
Sound IF
Response

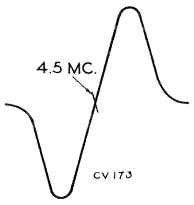


Figure 14
Ratio Det.
Response

Connect two matched 100,000 ohm resistors in series, between the junction of R104/R106 and ground.

Connect the "VoltOhmyst" from the junction between these resistors to terminal JJ of PC101.

Tune T102 (bottom), ratio detector secondary, for zero DC on the "VoltOhmyst".

Repeat the adjustments of T102 (top) for maximum DC and T102 (bottom) for zero DC making final adjustment with the input from the signal generator adjusted to produce −15 volts on the "VoltOhmyst" at the junction of R104 and R106.

Reconnect the "VoltOhmyst" between the junction of R104/R106 and ground. Adjust T101 (top and bottom) for maximum output on the "VoltOhmyst", setting the output of the signal generator to produce −15 volts when finally peaked.

Remove the resistors, signal generator and "VoltOhmyst" from the circuit. Remove the jumper at pin 8 of V109A.

VIDEO 4.5 MC TRAP ADJUSTMENT

Short the grid, pin 8 of V109A, 3rd Picture I-F Amplifier, with a short jumper to ground.

Obtain four 7.5 volt batteries capable of withstanding appreciable current drain and connect two of the batteries in series making a 15 volt bias supply. Connect the ends of a 1000 ohm potentiometer across the battery combination. Connect a potentiometer across the ends of each of the single 7.5 volt batteries. Connect the positive terminal of one 7.5 volt bias box to the chassis and the potentiometer arm to the junction of R127 and R128 (at V121A Killer circuit). Adjust the bias box for −7 volts DC at the junction point.

Connect the VHF signal generator to the grid of the 1st Video Amplifier, pin 2 of V110, and set the generator to 4.5 MC. with internal modulation of the generator.

Connect the oscilloscope, using the oscilloscope diode probe, to the plate of the Band Pass Amplifier, pin 1 of V121.

Adjust T108 (top), at the plate of V110, 1st Video Amplifier, for minimum 4.5 MC. indication on the oscilloscope.

Remove the jumper from pin 8 of V109A, the oscilloscope and the signal generator.

PICTURE I-F TRANSFORMER ADJUSTMENTS

Connect the I-F signal generator in series with a 1500 mmf. ceramic capacitor, to the mixer grid test point . . .

Connect the "VoltOhmyst" to terminal "G" of the printed picture I-F assembly PC102.

Connect the positive terminal of one 7.5 volt bias supply to the chassis and the potentiometer arm to terminal "G" of PC102. Adjust the potentiometer for −6 volts indication on the "VoltOhmyst".

Connect the "VoltOhmyst" to the junction of R127 and R129 and to ground.

Set the VHF generator to each of the following frequencies and with a thin fiber screwdriver tune the specified adjustment for maximum indication on the "VoltOhmyst". In each instance the generator should be checked against a crystal calibrator to insure that the generator is on frequency.

During alignment, reduce the input signal if necessary in order to produce −8 volts of DC at R127 and R129 with −6 volts of I-F bias at terminal "G" of PC102.

45.0 mc. T105
42.0 mc. T106
43.9 mc. T107

Set the signal generator to each of the following frequencies and adjust the corresponding circuit for minimum DC output at the junction of R127 and R129. Use sufficient signal input to produce 3.0 volts of DC on the meter when the final adjustment is made.

39.75 mc. L101
41.25 mc. . . . . T2 (outer) and T104 (top)
47.25 mc. L102

SWEEP ALIGNMENT OF PICTURE I-F

To align the mixer plate circuit, connect the sweep generator to the mixer grid test point TP2 in series with a 1500 mmf. ceramic capacitor. Use the shortest leads possible, with not more than one-half inch of unshielded lead at the end of the sweep cable. Connect the sweep ground lead to the top of the tuner.

Set the channel selector to channel 4.

Preset C102 to minimum capacity.

Adjust the bias box potentiometer to obtain −6.0 volts of bias as measured by the "VoltOhmyst" at terminal "G" of PC102.

Connect the load leads from the "I-F Test Block" to pin 1 of V108A and pin 6 of V109A, plates of the second and third picture I-F amplifiers.

Connect the "Detector" lead from the "I-F Test Block" to the plate of the first picture I-F amplifier, pin 1 of V107A, and the oscilloscope to the "Oscilloscope" terminals of the "I-F Test Block." (Refer to figure 15). Couple the VHF signal generator loosely to the first picture I-F amplifier grid in order to obtain markers.

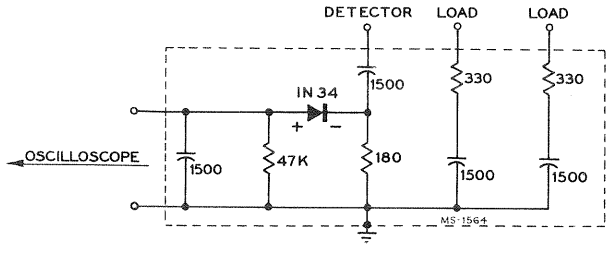


Figure 15—IF Test Block

Adjust T2 (inner core) and T104 (bottom) for maximum gain with 45.75 mc. at 70% of maximum response.

Adjust the shunt trimmer C102 until 42.17 mc. is at 50% response with respect to the maximum point of the curve and with 42.75 mc. at the shoulder on the low frequency side of the peak as shown in figure 16. Readjust T2 and T104 if necessary to obtain the proper wave shape as indicated in figure 16.

Disconnect the "I-F Test Block" and the oscilloscope.

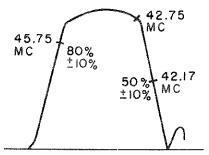


Figure 16
T2 and T104
Response

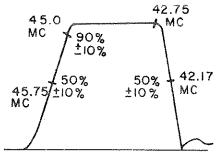


Figure 17
Overall
I-F Response

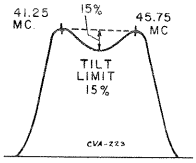


Figure 18
KRK37
L9 and C308
Response

Connect the oscilloscope to the junction of R127 and R129 and ground.

Leave the sweep generator connected to the mixer grid test point TP2 with the shortest leads possible used.

Adjust the output of the sweep generator to obtain 8.0 volts peak-to-peak on the oscilloscope.

Couple the signal generator loosely to the grid of the first picture I-F amplifier. Adjust the output of the signal generator to produce small markers on the response curve.

Retouch T105, T106 and T107 to obtain the response shown in Figure 17.

To align the I-F amplifier circuit of the KRK37, connect the VHF sweep generator to the front terminal of the 1N82 crystal holder in series with a 1000 ohm resistor and a 1500 mmf. ceramic capacitor. Use the shortest leads possible, grounding the sweep ground lead to the tuner case.

To do this, remove the crystal cover and connect the resistor, after insulating the lead with tubing, to the crystal front terminal.

Set the UHF CHANGEOVER switch to the UHF position, and the UHF TUNING between channels 43 and 44 at 650 mc.

Connect a 180 ohm composition resistor and a 1500 mmf. capacitor in series between test point TP3 and ground with the capacitor connected to TP3 and the resistor to ground. Connect the oscilloscope diode probe to the junction between the resistor and capacitor. (See Figure 22.)

Couple the VHF signal generator loosely to the diode probe in order to obtain markers.

Connect the potentiometer arm of the second bias supply to the AGC terminal on the tuner and ground the battery positive terminal to the tuner case. Adjust the bias potentiometer to produce −3.0 volts of bias, as measured by the "VoltOhmyst" at the AGC terminal on the tuner.

Set the sweep generator to produce 0.5 volt or less peak-to-peak on the oscilloscope.

Adjust C308, on the UHF section of the tuner for maximum gain with 45.75 mc. and 42.5 mc. markers as shown in figure 18.

If necessary adjust L35 to place the 45.75 mc. marker at the peak of the curve. Adjust L49 for minimum tilt of the curve as shown in figure 18. (Tilt limit is 20% maximum). If necessary knife coil L55 to obtain the bandwidth shown in figure 18.

Remove the resistor, capacitor and diode probe from TP3 and connect the oscilloscope to the junction of R127 and R129. Use 3.0v peak-to-peak on the oscilloscope.

Connect the VHF sweep generator to the antenna terminals. Keep the R-F AGC bias at −3.0 V and the I-F bias at −6.0 volts.

Couple the signal generator loosely to the grid of the first picture I-F amplifier.

Switch through all VHF channels and check for proper curve shape as in figure 17. Retouch T105, T106 and T107 slightly to correct for any overall tilt that is essentially the same on all channels.

Disconnect the VHF sweep generator and connect the UHF sweep generator to the antenna terminals. Check on all UHF channels for proper wave shape as shown in figure 17, retouching C308, L35 and L49 if necessary to correct any overall tilt.

Remove the sweep and marker generators and the bias supplies.

ANTENNA MATCHING UNIT ALIGNMENT

—The antenna matching unit is accurately aligned at the factory. Adjustment of this unit should not be attempted unless absolutely necessary since even slight misalignment may cause serious attenuation of the signal especially on channel 2. The tuner unit is aligned with a particular antenna matching transformer in place. If for any reason, a new antenna matching transformer is installed, the tuner unit should be re-aligned.

The F-M Trap which is mounted in the antenna matching unit may be adjusted without adversely affecting the alignment of the unit.

To align the antenna matching unit disconnect the lead from the F-M trap L5 to the channel selector switch S1F.

With a short jumper, connect the output of the matching unit through a 1000 mmf. capacitor to the grid of the second pix i-f amplifier, pin 6 of V108A.

Replace the cover on the matching unit while making all adjustments.

Remove the first pix i-f amplifier tube V107.

Connect the positive terminal of a bias box to the chassis and the potentiometer arm to terminal "G" of PC102. Set the potentiometer to produce approximately −6.0 volts of bias at terminal "G" of PC102.

Connect an oscilloscope to the junction of R127 and R129 and set the oscilloscope gain to maximum.

Connect a VHF signal generator to the antenna input terminals. Modulate the signal generator 30% with an audio signal.

NOTE.—Inductances in KRK37 matching units are not slug tuned and therefore must be knifed for adjustment.

Tune the signal generator to 45.75 mc. and adjust the generator output to give an indication on the oscilloscope. Adjust L4 (knife coil) in the antenna matching unit for minimum audio indication on the oscilloscope.

Tune the signal generator to 41.25 mc. and adjust L3 (knife coil) for minimum audio indication on the oscilloscope.

Remove the jumper from the output of the matching unit.

Connect a 300 ohm ½ watt composition resistor from L5 to ground, keeping the leads as short as possible.

Connect an oscilloscope low capacity crystal probe from L5 to ground. The sensitivity of the oscilloscope should be approximately 0.03 volts per inch. Set the oscilloscope gain to maximum.

Connect the VHF sweep generator to the matching unit antenna input terminals. In order to prevent coupling reactance from the sweep generator into the matching unit, it is advisable to employ a resistance pad at the matching unit terminals. Figure 20 shows three different resistance pads for use with sweep generators with 50 ohm co-ax output, 72 ohm co-ax output or 300 ohm balanced output. Choose the pad to match the output impedance of the particular sweep employed.

Connect the signal generator loosely to the matching unit antenna terminals.

Set the sweep generator to sweep from 45 mc. to 54 mc. With RCA Type WR59A sweep generators, this may be accomplished by retuning channel number 1 to cover this range. With WR59B sweep generators this may be accomplished by retuning channel number 2 to cover the range. In making these adjustments on the generator, be sure not to turn the core too far clockwise so that it becomes lost beyond the core retaining spring.

Adjust L1 and L3 (knife coils) to obtain the response shown in figure 19. L1 is most effective in locating the position of the shoulder of the curve at 52 mc. and L3 should be adjusted to give maximum amplitude at 53 mc. and above consistent with the specified shape of the response curve. The adjustments in the matching unit interact to some extent. Repeat the above procedure until no further adjustments are necessary. (NOTE.—Second harmonic output from the sweep generator may cause distortion of the response. Tune L5 F-M trap for maximum inductance to eliminate distortion

when adjusting the matching unit. Be sure to return the L5 slug to its original position after adjusting the matching unit to prevent attenuation on channel 5 or 6.)

Restore the connection between L5 and S1F. Replace V107.

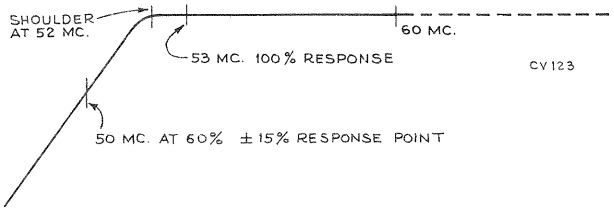


Figure 19—KRK37 Antenna Matching Unit Response

TUNER ALIGNMENT

VHF ALIGNMENT.—A tuner unit which is operative and requires only touch up adjustments, requires no presetting of adjustments. For such units, skip the remainder of this paragraph. For units which are completely out of adjustment, preset C33 all the way out. Set channel 7 to 13 oscillator slugs one turn from tight. Do not change any adjustment in the antenna matching unit.

Disconnect the link from the terminals of T2 and shunt the terminals with a 39 ohm composition resistor.

Short the AGC terminal of the tuner to ground with a short jumper.

Connect a 56 ohm composition resistor from L5 to ground at the tuner end of the coil. This point is accessible through the hole below the F-M Trap adjustment on the matching unit.

Set the channel selector switch to channel 8.

Preset C28 to read −3.5 volts at the test point TP1, as read on the "VoltOhmyst." The limits for oscillator injection voltage are 2.5 volts minimum and not exceeding a maximum of 5.5 volts.

Turn the fine tuning control fully clockwise.

Adjust C29 for proper oscillator frequency, 227 mc. This may be done in several ways. The easiest way and the way which will be recommended in this procedure will be to use the signal generator as a heterodyne frequency meter and beat the oscillator against the signal generator. To do this, tune the signal generator to 227 mc. with crystal accuracy. Insert one end of a piece of insulated wire into the tuner unit through the hole provided for the adjustment of C23. Be careful that the wire does not touch any of the tuned circuits as it may cause the frequency of the tuner oscillator to shift. Connect the other end of the wire to the "r-f" in terminal of the signal generator. Adjust C29 to obtain an audible beat with the signal generator.

Turn C33 (slug) clockwise until the beat note just begins to change, then turn one full turn in the same clockwise direction.

Return the fine tuning control to the mechanical center of its range.

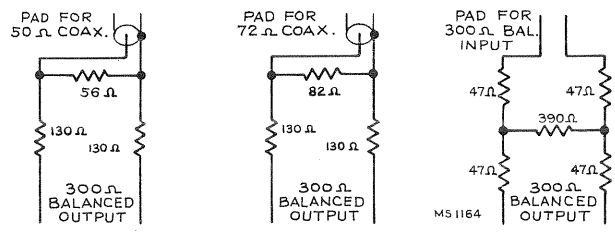


Figure 20—Sweep Attenuator Pads

NOTE.—If on some units, it is not possible to reach the proper channel 8 oscillator frequency by adjustment of C25, switch to channel 13 and adjust L56 to obtain proper channel 13 oscillator frequency as indicated in the table on page 8.

Switch back to channel 8 and readjust C33 (slug) and back again to channel 13 and adjust L56. Repeat several times until proper adjustment is obtained.

Connect the sweep generator through a suitable attenuator, as shown in figure 20 to the input terminals of the antenna matching unit.

Connect the signal generator loosely to the antenna terminals.

Set the sweep generator to cover channel 8.

Set the oscilloscope to maximum gain and use the minimum input signal which will produce a usable pattern on the oscilloscope. Excessive input can change oscillator injection during alignment and produce consequent misalignment even though the response as seen on the oscilloscope may look normal.

Insert markers of channel 8 picture carrier and sound carrier, 181.25 mc. and 185.75 mc.

Adjust C17, C23 and C26 for approximately correct curve shape, frequency, and band width as shown in figure 21.

C17 tunes the r-f amplifier plate circuit and affects the frequency of the pass band most noticeably. C26 tunes the mixer grid circuit and affects the tilt of the curve most noticeably. C23 is the coupling adjustment and hence primarily affects the response band width. Adjust C23 to place the markers at the 100% response points on the curve.

Connect the "VoltOhmyst" to test point TP1. Adjust C28 to read −3.5 volts dc on the "VoltOhmyst" at TP1. Readjust C26, C23 and C17 for proper response. Repeat if necessary until the proper response is obtained.

Set the receiver channel switch to channel 13.

Set the sweep generator to channel 13.

From the signal generator, insert channel 13 sound and picture carrier markers, 211.25 mc. and 215.75 mc.

Adjust L42 and L28 for proper response as shown in figure 21.

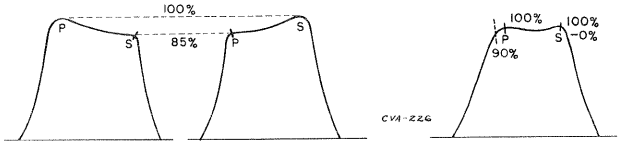


Figure 21—Tuner VHF R-F Response

Turn off the sweep and signal generators.

Connect the "VoltOhmyst" to the tuner test point TP1.

Check the oscillator injection voltage to be within limits as previously specified. Adjust if necessary to bring within range.

If it was necessary to readjust C28, turn the sweep and signal generators back on and recheck the channel 13 response. Readjust L42 and L28 if necessary.

Set the sweep generator and signal generator to channel 8.

Readjust C26, C23 and C17 for correct curve shape, frequency and band width.

Turn off the sweep and signal generators, switch back to channel 13 and check the oscillator injection voltage at TP1 if C26 was adjusted in the recheck of channel 8 response.

If the initial setting of the oscillator injection trimmer was far off it may be necessary to adjust the oscillator frequency and response on channel 8, adjust the oscillator injection on channel 13 and repeat the tracking procedure several times before the proper setting is obtained.

Check the response on channels 7 through 13 to insure all channels are within limits with respect to tilt, bandwidth and injection voltage.

Turn off the sweep generator and switch the receiver to channel 6.

Adjust the signal generator to the channel 6 oscillator frequency 129 mc.

Set the fine tuning control to the center of its mechanical range.

Adjust L61 for an audible beat. Turn the sweep generator back on and set to channel 6. Adjust L40 and L54 for proper curve shape as shown in figure 21. The valley should be approximately 20%. Recheck the oscillator injection voltage at TP1, to insure that it is within the limits specified. Readjust C28 if necessary.

If C28 required adjustment, switch the receiver and the signal generator to channel 8. Readjust C26 for correct curve shape and recheck C29 and C33 for proper oscillator frequency.

Check the response of channels 2 through 6 by switching the receiver channel switch, sweep generator and marker generator to each of these channels and observing the response and oscillator injection voltage obtained. See figure 21 for typical response curves. It should be found that all these channels have the proper response with the markers above 85% response and the valley approximately 20% down.

If the markers fail to fall within this requirement readjust L40 and L54. Knife coils L36 to L39 and L50 to L53 to achieve minimum tilt on channels 5 through 2 in order to obtain proper response. Always knife coils from highest channel to lowest to avoid affecting the tuning of the channels above the one being knifed.

Switch the channel selector, signal generator and marker generator through channels 7 to 13 and observe the response curves, referring to figure 21 for proper wave shape. Check the injection voltage at each channel to be within limits. If necessary readjust C17 or C16 to obtain the proper response.

With the receiver and signal generator on channel 13 adjust L49 for an audible beat with the signal generator.

Adjust the oscillator to frequency on all channels by switching the receiver and the frequency standard to each channel and adjusting the appropriate oscillator slug to obtain the audible beat. It should be possible to adjust the oscillator to obtain the audible beat on each channel. Recheck the oscillator injection voltage on each channel to verify that the voltage is within the specified limits.

Connect the oscilloscope to the junction of R127 and R129 and turn the oscilloscope gain to maximum.

Connect one of the 7.5 volt bias supplies to Terminal "G" of PC102 and ground the positive terminal of the supply.

Adjust the potentiometer to read −6.0 volts of bias at terminal "G".

Connect the 15 volt bias supply to the AGC terminal of the tuner and set the supply to read −15 volts at the AGC terminal.

Set the sweep generator to channel 13 and adjust L21 for minimum indication on the oscilloscope.

Switch the sweep generator to channel 6 and adjust L26 for minimum indication on the oscilloscope.

Remove the oscilloscope and reconnect to test point TP1 on the tuner.

Readjust the bias supply to read −3.0 volts of bias at the AGC terminal on the tuner.

Set the sweep generator to channel 8 and insert channel 8 picture and sound markers.

Observe the response on the oscilloscope and adjust C12 for maximum amplitude at the midpoint of the curve.

Switch the sweep and marker generators to channel 13 and adjust L12 (knife coil) for maximum amplitude at midpoint of the curve. Switch back to channel 8 and readjust C12 and then back to channel 13 and readjust L12.

Reconnect the oscilloscope to the junction of R127 and R129 and increase the bias at the AGC terminal to −15 volts once more. On channel 13 readjust L21 for minimum indication on the oscilloscope and on channel 6 readjust L26 for minimum indication.

Move the oscilloscope back to test point TP1 and reset the bias supply for −3.0 volts at the AGC terminal. Touch up C12 on channel 8 and L12 on channel 13 once more for maximum indication at the midpoint of the response curve.

Switch the sweep and marker generators to channel 6.

Adjust L17 for maximum amplitude at the midpoint of the curve.

Switch through all channels from channel 13 down to channel 2 and observe the response. The valley at the midpoint of the curve should now be 85% or above on all channels. If not it will be necessary to knife coils L7 through L11 and L13 through L16 to achieve this condition. Be sure to knife the coils starting at the highest frequency channel and proceeding to the lowest. This is important as adjustment of any coil will affect all channels lower in frequency.

Remove all test equipment used in the above procedure.

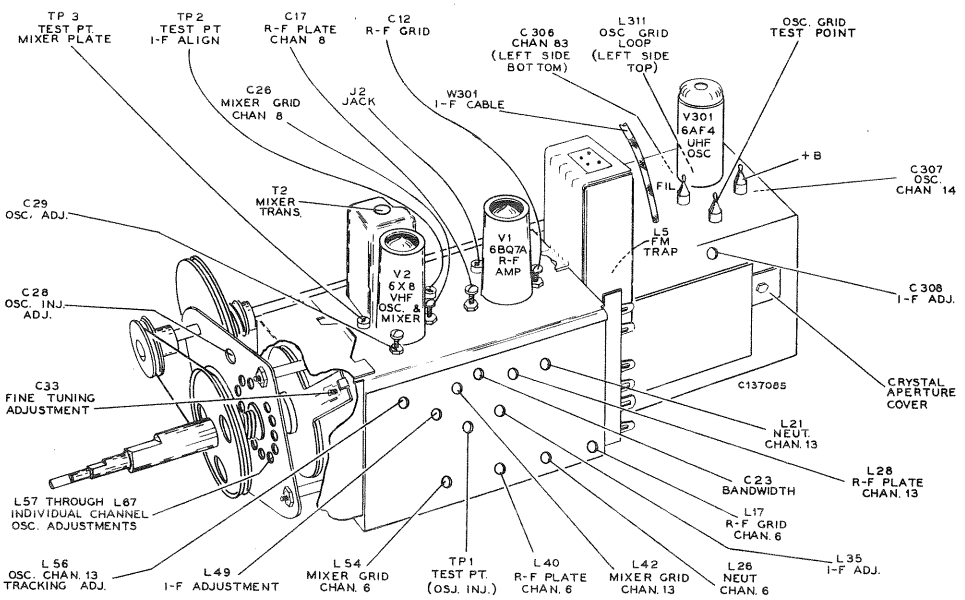


Figure 22—Tuner Adjustments

UHF ALIGNMENT.—R-F alignment of the UHF section of the tuner may only be performed with the UHF section removed from the tuner assembly. RF adjustments require removal of the tuner shield which may only be done with the UHF tuner separate from its mounting.

I-F and oscillator adjustment may be accomplished without removing the tuner.

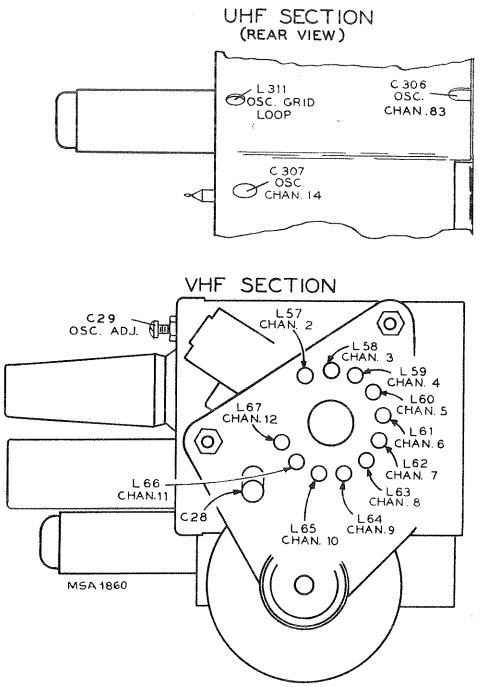


Figure 23—Tuner Oscillator Adjustments

Connect a 100 ohm composition resistor between the center conductor of the I-F cable W301 and the tuner case.

Connect the oscilloscope using diode detector, to the center conductor of W301 at the 100 ohm resistor, employing the preamplifier if needed with the oscilloscope used. Ground the oscilloscope to the tuner case.

Connect the output of the UHF sweep generator, through a 300 ohm attenuator pad, to the antenna terminals and set the sweep generator to sweep channel 83, centered on 887.5 mc. Adjust the output of the sweep generator to full sweep width.

A test dial made to fit over the split gear on the tuner shaft is necessary for accurate alignment. Scribe marks at 0°, 5° and 164° should be marked on the test dial for reference. The 0° reference point is located with the capacitor plates fully meshed. With the stop pin on the tuner against the stop plate on the gear assembly the plates will be in the proper fully meshed position.

Rotate the tuning dial to the 164°, Channel 83, position.

Connect the VHF signal generator in series with a 1000 ohm resistor to the junction of W301 and L310. This may be done by inserting the lead from the resistor, which should be covered with insulated tubing, through the aperture provided for crystal removal. (See figure 22.) Insert markers for 41.25 mc., 43.5 mc. and 45.75 mc.

Connect the UHF marker generator loosely to the antenna terminals and insert a marker at 887.5 mc.

Adjust R-F trimmer capacitor tabs C304 and C305 for a maximum amplitude overcoupled response curve centered at 887.5 mc. as shown in figure 24(A).

Adjust the oscillator trimmer capacitor C306 until the 43.5 mc. marker coincides with the marker at 887.5 mc. The markers for 41.25 and 45.75 should be symmetrically located on the top of the response curve as in figure 24(A).

Set the UHF sweep and marker generators to 473.5 mc. Rotate the tuning dial to the 5°, Channel 14, position.

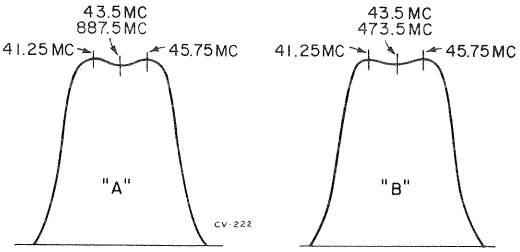


Figure 24—Tuner UHF R-F Responses

Adjust the oscillator trimmer C307 until the 43.5 mc. marker coincides with the 473.5 mc. marker, with the 41.25 and 45.75 markers as shown. The inductance loop L311 across the oscillator grid coil may be repositioned, if necessary, to bring the oscillator trimmer within range. Refer to figure 22 for location of the aperture for making this adjustment.

Repeat the above adjustments, as necessary, until the proper responses are obtained. Tune through the entire range and check the tracking. When perfectly tracked the markers should be on top of the response curves, however, mistracking to the extent indicated below are permissible.

Using the highest amplitude marker as a 100% reference level, the other marker shall not fall below 86% (75%) and no portion of the response curve shall exceed 107% (115%). Midpoint of the curve shall be between 92% (85%) and 107% (115%).

NOTE: Percentages shown are for observation with a linear detector. Parenthesized values are where a square law detector is employed. The plates must be knifed with the shield cover removed. Always knife the plates while tuning lower in frequency to prevent affecting the tracking above the point of knifing.

Connect the "VoltOhmyst" between the center conductor of W301 and ground. Set the "VoltOhmyst" to the 1.5v. DC scale. Tune over the entire range observing the reading on the meter. A reading between .03 and .4 volts should be obtained. Voltages outside these limits are an indication of low B voltage, low or high crystal impedance or an oscillator tube outside allowable limits. This voltage is an indication of correct crystal current and may be varied by repositioning the flag L309 with respect to L303.

Connect the "VoltOhmyst" to the "Osc. Grid Test Point" of the tuner (refer to figure 22). A reading between .75 and 3.5 volts should be obtained. Readings above or below this range will cause crystal currents outside allowable limits and in such cases the oscillator tube should be replaced. Replacement of the oscillator tube will require recalibration at the high and low frequency ends of the band as previously outlined.

1ST VIDEO AMPLIFIER AND BAND PASS AMPLIFIER ALIGNMENT

Set the channel selector to channel 4.

Connect the potentiometer arm of one 7.5 volt bias supply to pin 6 of V102B, the 1st audio amplifier, and ground the positive terminal of the bias supply to the chassis. Set the potentiometer to read −2.0 volts DC on the "VoltOhmyst" at pin 6 of V102B.

Connect the potentiometer arm of the second 7.5 volt bias supply to the I-F bias buss at terminal "G" of PC102, and ground the positive terminal of the supply to the chassis. Set the potentiometer arm for a reading of −6.0 volts on the "VoltOhmyst" at terminal "G" of PC102.

Remove the demodulator tube V125.

Connect the wide-band oscilloscope, using the oscilloscope diode probe, to the junction of R127 and R129 at the 1st Video Amplifier cathode.

Connect the television picture carrier signal generator and modulator to the antenna terminals and set to channel 4. With zero modulation, adjust the output for 1.5 volts on the "VoltOhmyst" between pin 2 of V110 and the junction of R127 and R129.

Modulate the generator with a video sweep being careful not to overload.

Couple the VHF signal generator loosely to the 1st picture I-F amplifier grid and adjust for a 45.75 MC marker.

Adjust the fine tuning control to obtain a beat pattern on the oscilloscope. This will set the oscillator exactly on frequency.

Remove the signal generator from the 1st picture I-F amplifier grid.

The response on the oscilloscope should correspond to that shown in figure 25.

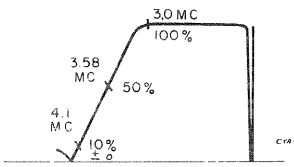


Figure 25—Video Response at 1st Video Amplifier

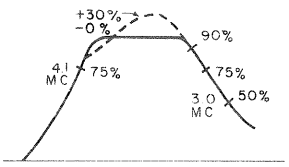


Figure 26—Overall I-F and Video Peaker Response

Disconnect the oscilloscope and diode probe from the junction of R127 and R129 and reconnect the oscilloscope and diode probe, to terminal "B" of T113, the Band Pass transformer.

Load the transformer by connecting a 330 ohm, 1 watt, resistor across terminals "A" and "B" of T113.

Connect the negative side of the 15 volt bias supply to pin 9 of V119, grid of the Burst Keyer. Also connect the negative side of the supply to the junction of R217 and R218 at the Killer V121A. Ground the positive terminal of the supply.

Set the bias supply potentiometer for a reading of −7.0 volts at these two points.

Adjust T108 (bottom) for correct curve shape as shown in figure 26.

Remove the 330 ohm loading resistor from T113 and reconnect it across terminals "C" and "F" of T114, the Demodulator Driver Transformer.

Connect the oscilloscope and diode probe to terminal "F" of T114.

Increase the bias voltage at pin 9 of V119 and the junction of R217 and R218 to −15 volts.

Adjust T113 (top and bottom) for correct wave shape as indicated in figure 27. Slight readjustment of I-F transformer T106 may be necessary to achieve the proper response.

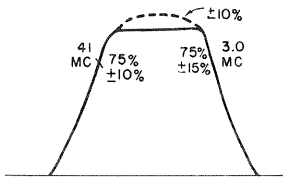


Figure 27—Overall I-F and Band Pass Response

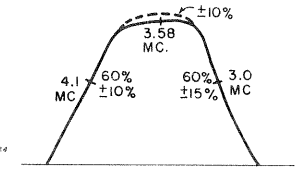


Figure 28—Overall Response at Demodulators

Connect the oscilloscope and diode probe in series with a 2 mmf. capacitor to pin 1 of V125 the "R-Y" Demodulator.

Adjust T114, the Demodulator Driver transformer, for the response shown in figure 28.

NOTE—Where readjustment of T106 is required in the adjustment of T113 to obtain the response shown in figure 27, a recheck of the overall I-F response should be made. The curve, with marker limits as indicated, must conform to figure 17, on all VHF and UHF channels after completion of the Video Alignment.

Remove all test equipment used. Replace the HV fuse F101 and remove the 1500 ohm +B loading resistor from the +375 volt buss.

Replacement of the fuse F101 should be made only with a 450MA Type AG fuse.

AGC AND NOISE THRESHOLD ALIGNMENT

The adjustment of the Noise Threshold and AGC controls should be made as outlined under INSTALLATION INSTRUCTIONS on page 3 to conform to certain specific areas, should such adjustment be indicated.

HORIZONTAL OSCILLATOR ALIGNMENT

NOTE—The interlock switch S104 on the rear of the chassis must be held open by the interlock plug to perform these adjustments.

Tune in a station and synchronize the picture.

Preset the horizontal drive control R162, on top of the receiver chassis, fully clockwise. Set the width switch, on the rear of the H.V. compartment, to the number 2 position.

Adjust the vertical hold control R110A, if necessary, to sync the picture vertically.

Adjust the horizontal frequency core L118, if necessary, to bring the picture into sync horizontally.

Connect the oscilloscope to the junction of L118, L119 and R164 under the chassis. Adjust the sine wave coil L119 for proper wave shape as shown in figure 29.

Adjust the waveform adjustment core of L119 until the two peaks are at the same height. During this adjustment, the picture must be kept in sync by readjusting the horizontal (freq.) control if necessary.

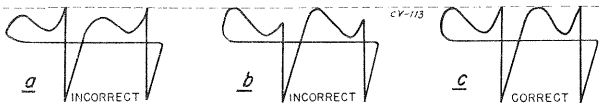


Figure 29—Horizontal Oscillator Waveforms

Operation of the horizontal (freq.) control, should cause the picture to lose sync at either end of its rotation. From the counter-clockwise position, the picture should pull into sync with between 1 and 3 bars present. The picture should remain in sync for a minimum of three complete turns of the control clockwise from the pull-in point.

The proper point of operation of the control is determined as follows:—Turn the control fully clockwise, then counter-clockwise until pull-in occurs. Continue counter-clockwise rotation for two full turns past the pull-in point. This will set the proper operating position of the control.

H.V. AND HORIZONTAL DEFLECTION ADJUSTMENT

Turn both the Contrast control R134 and the Brightness Control R107A fully counter-clockwise.

Connect the high voltage probe to the "VoltOhmyst" and set the meter for a 25 KV reading.

Reading the voltage, at the cap of V113, the shunt regulator, with the high voltage probe, adjust the HV adjustment R151 for a 25KV reading on the "VoltOhmyst".

Remove the HV fuse F101 and connect the leads of the 0-500 millimeter across the fuse terminals.

Adjust L117, the horizontal tuning coil, for minimum reading on the meter.

Set the horizontal drive control R162, as far clockwise as possible without the white overdrive line appearing in the picture.

Recheck the operation of the horizontal (freq.) control L118 to assure that the operation is still proper as previously determined by horizontal oscillator adjustment.

NOTE—To check the performance of the H.V. circuit, a reading should be taken of the current of V113 the 6BK4 shunt regulator. Insert a current meter in the cathode circuit of the 6BK4. A reading of at least 700 microamperes should be obtained with 25KV of ultor anode voltage.

Adjust the height control R176A and the vertical linearity control R176B for proper vertical linearity of the picture. Make the final adjustments to provide vertical overscan of the viewing area by approximately one-half inch at both top and bottom.

Remove all test equipment used in the preceding adjustments.

COLOR AFC ALIGNMENT

A color bar signal should be fed to the receiver for AFC alignment. (A transmitted signal may be used if available.)

Turn the color bar generator "on" (allow 5 minute warmup), and connect the "VoltOhmyst" to the metering terminals.

Set the metering switch to the "SUB-CARRIER" position and set the "SUB-CARRIER AMP." control to maximum. A reading of −1.2 volts (±20%) should be obtained on the "Volt-Ohmyst." Set the metering switch to the "SYNC" position and adjust the "SYNC AMPLITUDE" control for a reading of −1.5 volts on the "VoltOhmyst" from the metering terminals.

Depress the "60 CYCLE MOD." button. The reading should increase to −1.85 volts. Turn the metering switch to "off."

Connect the "R-F OUT." of the color bar generator to the receiver antenna terminals. Turn the channel selector to channel 3 or 4 (whichever crystal has been supplied with the generator) and adjust the "HOR. HOLD" control of the generator until the bar pattern synchronizes on the kinescope.

Adjust the Fine Tuning control until the picture on the kinescope shows no sound interference. Advance the Color control R216, until color appears in the bar pattern. If the width control is properly adjusted (as explained in Installation Instructions) 10 color bars will be seen on the kinescope.

Connect the −15 volt bias supply to the junction of R217 and R218 at the Killer V121A.

Ground terminal "C" of T113 with a short jumper.

Connect the "VoltOhmyst" to pin 7 of the phase detector V120.

Adjust T115 (bottom) for maximum DC reading on the "VoltOhmyst". Set the Hue control to the center of its range and adjust L125 the Hue coil for maximum DC reading on the "VoltOhmyst".

Remove the jumper shorting terminal "C" of T113 to ground.

Adjust T112 (bottom) for a maximum DC reading on the "VoltOhmyst".

Ground the junction of L126, R241 and C198 in the grid circuit of the reactance tube V122B.

Carefully adjust L127, the Reactance Coil, for zero beat at the output, which may be observed on the oscilloscope, connected to the red kinescope grid or on the face of the kinescope.

Remove the short to ground at the junction of L126, R241 and C198 and connect the "VoltOhmyst" to this point.

Shunt the 3.58 mc crystal CR102 with a 10 to 15 mmf. capacitor.

Adjust the AFC Balance Control R228 on top of the receiver chassis for zero reading on the "VoltOhmyst".

Remove the capacitor shunting the crystal CR102 and disconnect the "VoltOhmyst" and the bias supply.

Set the Color control to the middle of its range and adjust the receiver to obtain the bar pattern on the kinescope.

Connect the oscilloscope to the red kinescope grid, pin 2, at the terminal at the chassis rear. (Refer to figure 31). The pattern on the oscilloscope should show the 3rd and 9th bars

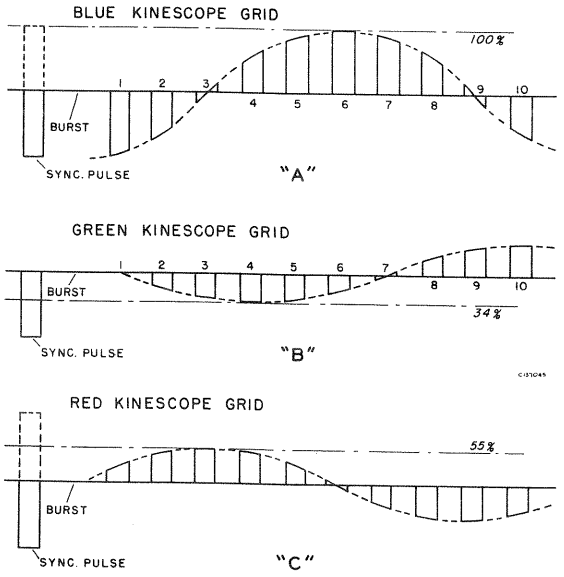


Figure 30—Matrix Waveforms

to be approximately one-half the height of the sync pulse, the 6th bar should be on the zero axis.

Adjust T112 until the 6th bar is at the zero axis. (Refer to figure 30.)

Connect the oscilloscope to the blue kinescope grid, pin 12, at the terminal at the rear of the chassis.

The 6th bar should be at the same height as the sync pulse and the 3rd and 9th bars should be on the zero axis.

Adjust T115 (top) until the 3rd and 9th bars are on the zero axis.

Check each of the kinescope grids to determine that Burst is not present. There should be no burst bar present as shown in figure 30.

Set the "SUB-CARRIER AMP" on the Color Bar Generator to the number 3 position. Advance the Killer Threshold control on the rear chassis apron until color disappears from the bar pattern. Reverse the rotation until color just appears at the 30% setting of the "SUB-CARRIER AMP" generator control.

A reasonable check and adjustment of the demodulator phase of the receiver may be made in the field, by the following method, where an oscilloscope is not readily available.

Turn the color bar generator "on" (allow 5 minute warmup), and connect the "VoltOhmyst" to the metering terminals. Set the metering switch to the "SUB-CARRIER" position and set the "SUB-CARRIER AMP" control to maximum. A reading of −1.2 volts (±20%) should be obtained on the "Volt-Ohmyst". Set the metering switch to the "SYNC" position and adjust the "SYNC AMPLITUDE" control for a reading of −1.5 volts on the "VoltOhmyst" from the metering terminals.

Depress the "SYNC AMPLITUDE" button. The reading should increase to −1.85 volts. Turn the metering switch to "off."

Connect the "R-F OUT." of the color bar generator to the receiver antenna terminals. Turn the channel selector to channel 3 or 4 (whichever crystal has been supplied with the generator) and adjust the "HOR. HOLD" control of the generator until the bar pattern synchronizes on the kinescope.

Adjust the Fine Tuning control until the picture on the kinescope shows no sound interference. Advance the Color control R216, until color appears in the bar pattern. If the width control is properly adjusted (as explained in Installation Instructions) 10 color bars will be seen on the kinescope.

Set the contrast and brightness controls to normal setting as in reception of a black and white picture.

Set the Color control R216 to the center of its range.

Set the Hue control to the center of its range. Connect separate 100,000 ohm resistors from the green and blue kinescope grids to ground at the chassis rear apron. Observe the bar pattern on the kinescope. The sixth bar should be the same brightness level as the background. If necessary, adjust T112 until the sixth bar is the same brightness as the background.

Shunt the red and green kinescope grids. The third and ninth bars should be the same brightness level as the background. If necessary, adjust T115 (top) until the centers of the third and ninth bars are the same brightness level as the background.

Shunt the red and blue kinescope grids. The centers of the first and seventh bars should be the same brightness level as the background.

Remove the color bar generator and the shunts on the kinescope grids.

(Alternate Method for Demodulator Phase Adjustment using 100% Saturated Color Bar Signal.)

The phasing adjustment should be made only after the completion of the receiver alignment and H.V. Adjustment are completed, with the receiver tuned for a 100% saturated color bar signal from the station (or provided from another source).

Adjust the contrast control R134, the Color control R216 and the Hue control to mid-range.

Connect the oscilloscope to red Kinescope grid on the rear apron and check the cancellation of the green, blue and cyan bars. Adjust T112 for best cancellation of green, blue and cyan.

Connect the oscilloscope to the blue kinescope grid and adjust T115 (top) for best cancellation of red and green.

Connect the oscilloscope to the green kinescope grid and check for cancellation of red, magenta and blue.

Repeat the above adjustments until best overall cancellation is obtained.

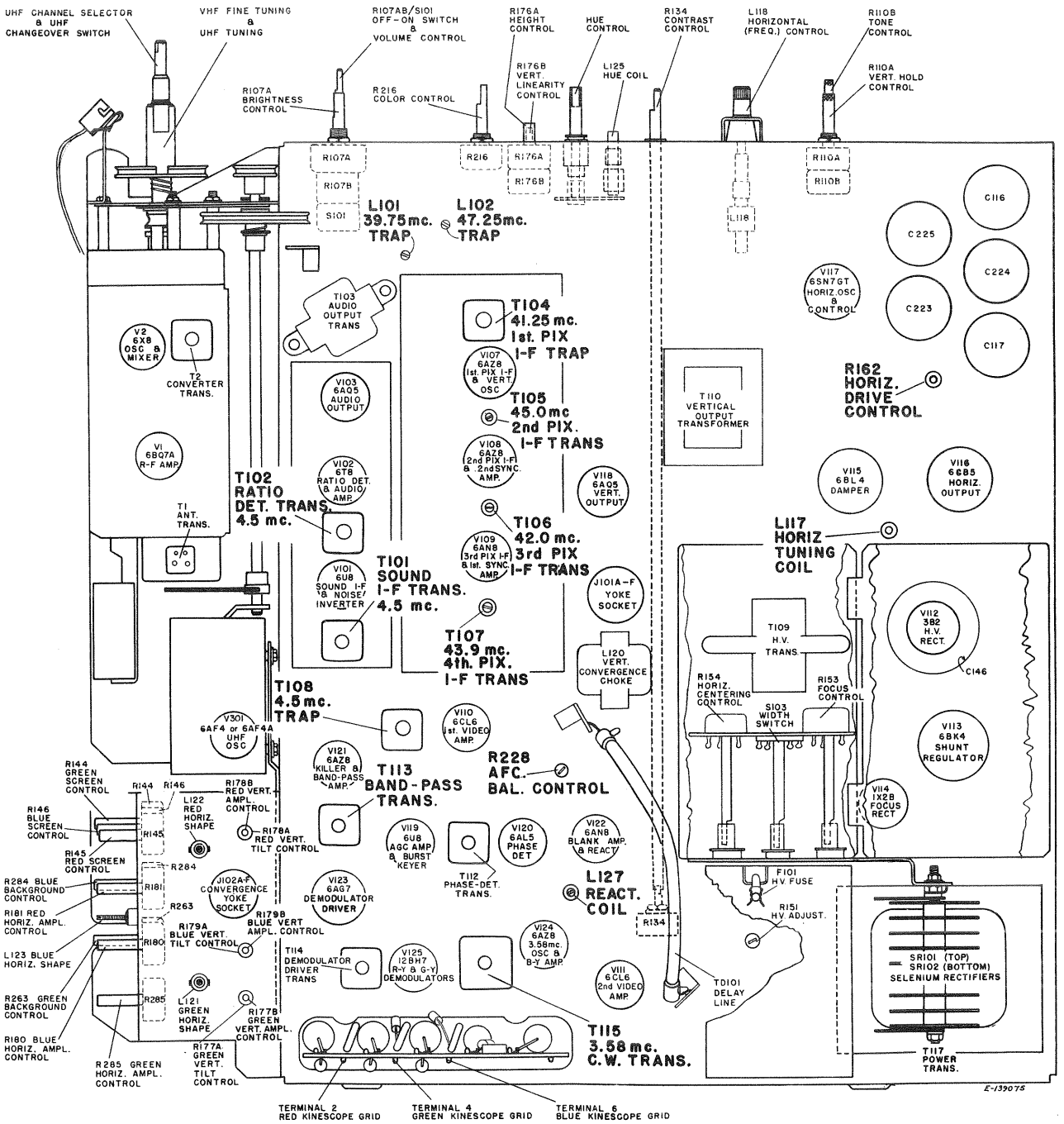


Figure 31—Top Chassis View showing Adjustments

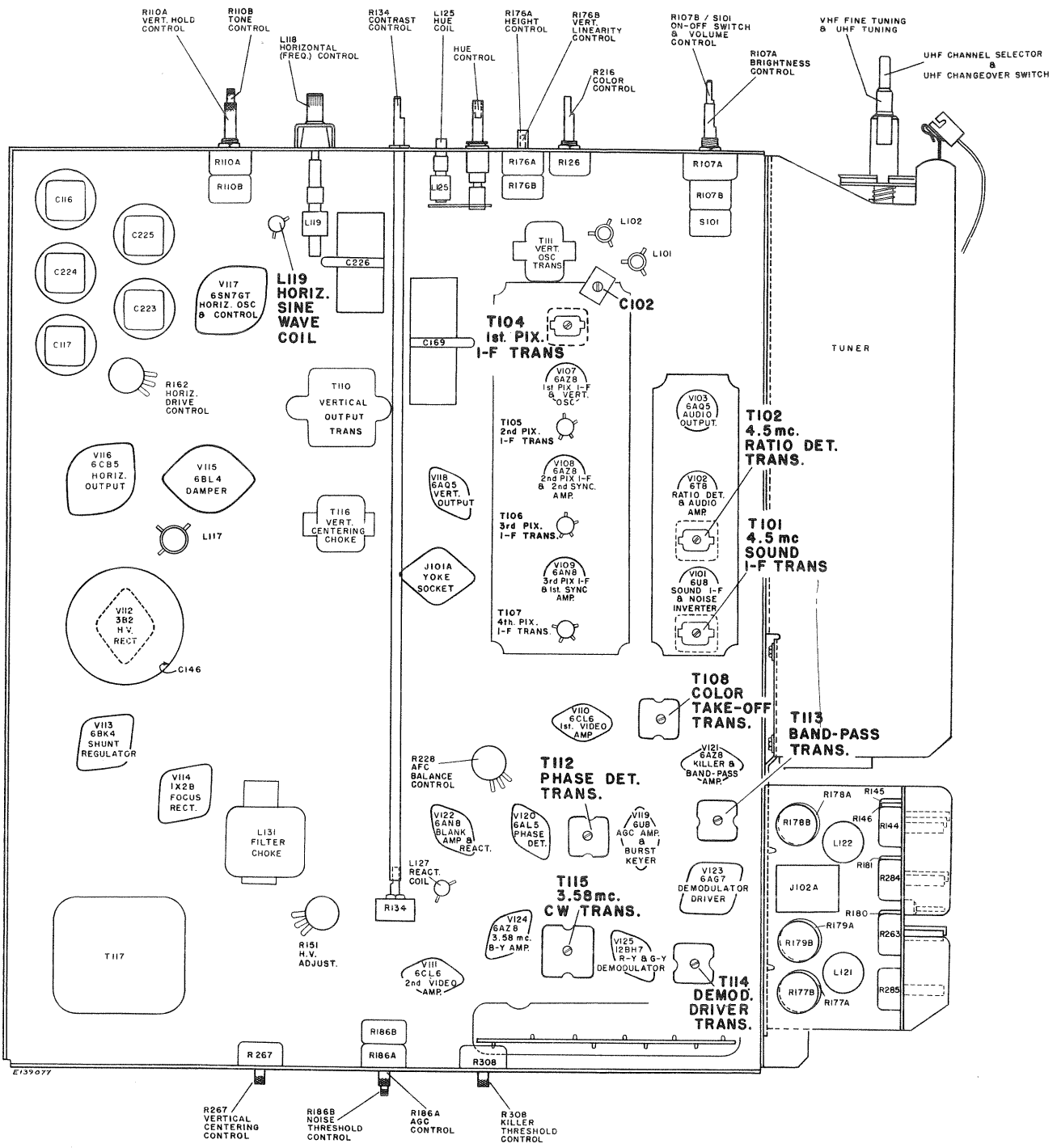


Figure 32—Bottom Chassis View showing Adjustments

VOLTAGE CHART

The following measurements represent three sets of conditions. In the first condition, a 1000 microvolt black and white signal was fed into the receiver, the picture synced and the AGC control properly adjusted. The second condition was obtained by removing the antenna leads and short circuiting the receiver antenna terminals. In the third condition a 1000 microvolt color bar signal was fed to the receiver as indicated by readings in the color section. Voltages shown are read with a type WV97A senior "VoltOhmyst" between the indicated terminal and chassis ground and with the receiver operating on 117 volts, 60 cycles, a-c.

Tube No.	Tube Type	Function	Operating Condition	E. Plate		E. Screen		E. Cathode		E. Grid		I Plate (ma.)	I Screen (ma.)	Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts			
V101A	6U8	Sound I-F Amp.	1000 Mu. V. B&W Signal	6	127	3	127	7	1.25	2	−0.5	—	—	At normal volume
			No Signal	6	120	3	120	7	1.5	2	0	—	—	—
V101B	6U8	Noise Inverter	1000 Mu. V. B&W Signal	1	129	—	—	8	2.7	9	−13.2	—	—	At normal volume
			No Signal	1	106	—	—	8	2.9	9	−8.0	—	—	—
V102A	6T8	Ratio Detector	1000 Mu. V. B&W Signal	2 1	−31 −16	— —	— —	3 7	−17 0	— —	— —	—	—	At normal volume
			No Signal	2 1	−3.1 −1.4	— —	— —	3 7	−17 0	— —	— —	—	—	—
V102B	6T8	1st Audio Amplifier	1000 Mu. V. B&W Signal	9	94	—	—	7	−2.2	8	−0.7	—	—	At normal volume
			No Signal	9	92	—	—	7	0	8	−0.6	—	—	—
V103	6AQ5	Audio Output	1000 Mu. V. B&W Signal	5	360	6	370	2	144	7	124	—	—	At normal volume
			No Signal	5	355	6	355	2	140	7	121	—	—	—
V107A	6AZ8	1st Pix I-F Amplifier	1000 Mu. V. B&W Signal	1	*	2	228	3	0.47	6	−7.0	—	—	*Unreliable measuring point. Meter disrupts circuit operation. Check +B at screen.
			No Signal	1	*	2	110	3	1.1	6	0	—	—	
V107B	6AZ8	Vertical Oscillator	1000 Mu. V. B&W Signal	8	94	—	—	7	0	9	−33	—	—	
			No Signal	8	93	—	—	7	0	9	−33	—	—	
V108A	6AZ8	2nd Pix I-F Amplifier	1000 Mu. V. B&W Signal	1	*	2	250	3	0.35	6	−7.0	—	—	
			No Signal	1	*	2	114	3	1.0	6	0	—	—	
V108B	6AZ8	2nd Sync. Amplifier	1000 Mu. V. B&W Signal	8	47	—	—	7	0	9	−5.0	—	—	
			No Signal	8	45	—	—	7	0	9	−0.6	—	—	
V109A	6AN8	3rd Pix I-F Amplifier	1000 Mu. V. B&W Signal	6	*	7	136	9	1.8	8	0	—	—	
			No Signal	6	*	7	133	9	1.8	8	0	—	—	
V109B	6AN8	1st Sync Amplifier	1000 Mu. V. B&W Signal	1	32	—	—	3	0	2	−23	—	—	—
			No Signal	1	25	—	—	3	0	2	−4.5	—	—	—
V110	6CL6	1st Video Amplifier	1000 Mu. V. B&W Signal	6	130	3-8	130	1	3.9	2-9	1.5	—	—	—
			No Signal	6	106	3-8	118	1	4.1	2-9	2.7	—	—	—
V111	6CL6	2nd Video Amplifier	1000 Mu. V. B&W Signal	6	232	3-8	130	1	1.9	2-9	−2.8	—	—	—
			No Signal	6	230	3-8	121	1	1.6	2-9	−3.0	—	—	—

Tube No.	
V112	3B
V113	6B
V114	1X
V115	6B
V116	6C
V117	6S — 6S
V118	6A
V119A	6U
V119B	6U
V120	6A

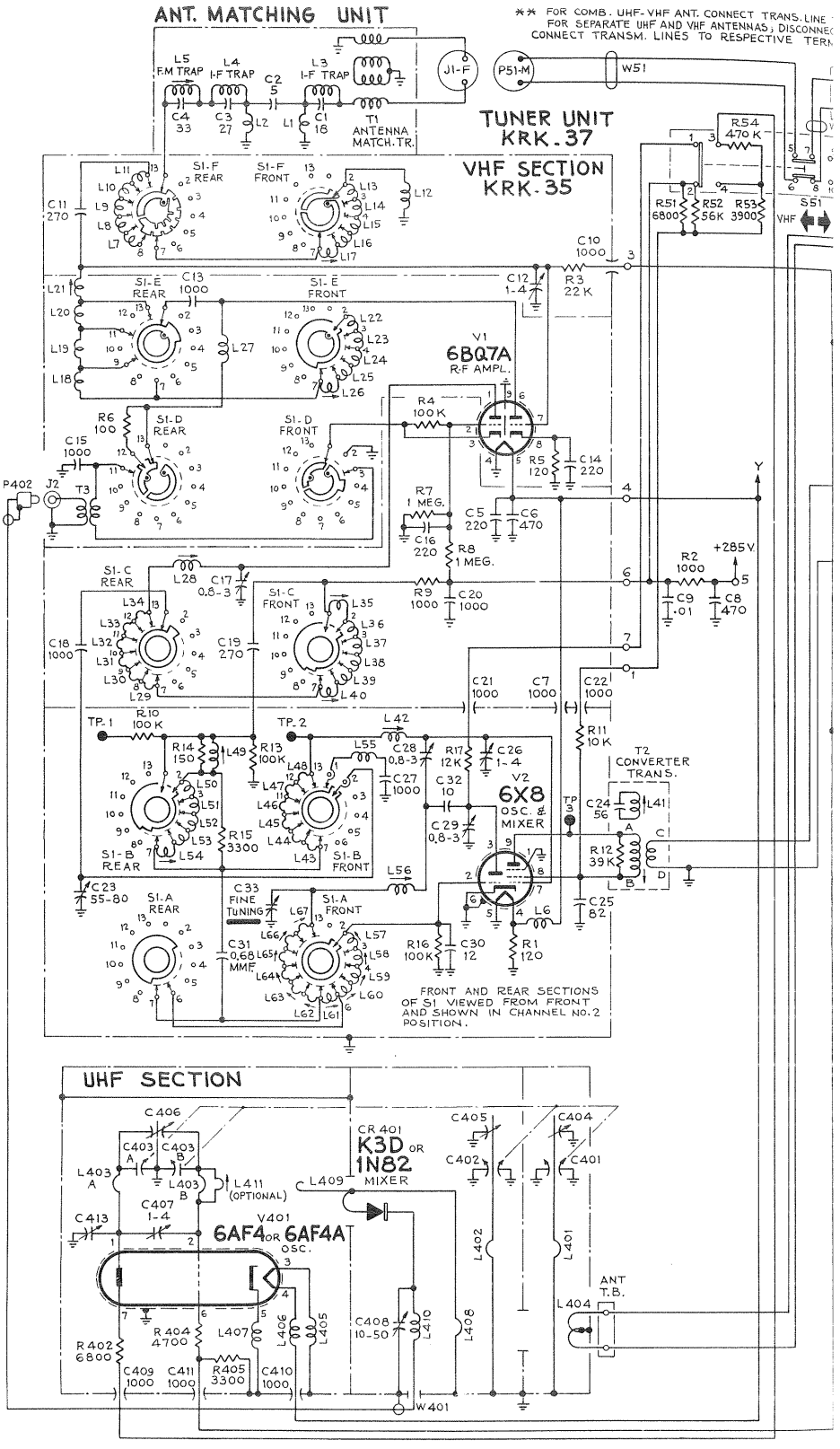
VOLTAGE CHART

Tube No.	Tube Type	Function	Operating Condition	E. Plate		E. Screen		E. Cathode		E. Grid		I Plate (ma.)	I Screen (ma.)	Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts			
V112	3B2	H.V. Rectifier No Signal	1000 Mu. V. B&W Signal	Cap	*	—	—	1	25,000	—	—	—	—	*H.V. Pulse present
			No Signal	Cap	*	—	—	1	25,000	—	—	—	—	
V113	6BK4	Shunt Regulator	1000 Mu. V. B&W Signal	Cap	25,000	—	—	1	380	5	363	—	—	—
			No Signal	Cap	25,000	—	—	1	380	5	370	—	—	—
V114	1X2B	Focus Rectifier	1000 Mu. V. B&W Signal	Cap	*	—	—	4	*	—	—	—	—	*H.V. Pulse present
			No Signal	Cap	*	—	—	4	*	—	—	—	—	
V115	6BL4	Damper	1000 Mu. V. B&W Signal	5	380	—	—	3	800	—	—	—	—	—
			No Signal	5	380	—	—	3	800	—	—	—	—	—
V116	6CB5	Horizontal Output	1000 Mu. V. B&W Signal	Cap	*	1–8	142	3–6	−24	4–5	−64	—	—	*H.V. Pulse present
			No Signal	Cap	*	1–8	150	3–6	−27	4–5	−70	—	—	
V117	6SN7GT	Horizontal Oscillator	1000 Mu. V. B&W Signal	5	220	—	—	6	0	4	−82	—	—	—
			No Signal	5	230	—	—	6	0	4	−86	—	—	—
	6SN7GT	Horizontal Osc. Control	1000 Mu. V. B&W Signal	2	298	—	—	3	4.6	1	−24	—	—	—
			No Signal	2	285	—	—	3	4.9	1	−23	—	—	—
V118	6AQ5	Vertical Output	1000 Mu. V. B&W Signal	5	280	6	280	2	18	1–7	0	—	—	—
			No Signal	5	285	6	285	2	19	1–7	0	—	—	—
V119A	6U8	AGC Amplifier	1000 Mu. V. B&W Signal	6	−89	3	298	7	144	2	130	—	—	—
			No Signal	6	−1.0	3	285	7	140	2	119	—	—	—
V119B	6U8	Burst Keyer	1000 Mu. V. B&W Signal	1	295	—	—	8	0	9	−44	—	—	—
			No Signal	1	280	—	—	8	0	9	−43	—	—	—
			1000 Mu. V. Color Bars	1	295	—	—	8	0	9	−44	—	—	—
V120	6AL5	Phase Detector	1000 Mu. V. B&W Signal	7	−10	—	—	1	0	—	—	—	—	—
			No Signal	7	−10	—	—	1	0	—	—	—	—	—
			1000 Mu. V. Color Bars	7	−30	—	—	1	0	—	—	—	—	—
			1000 Mu. V. B&W Signal	2	0	—	—	5	10	—	—	—	—	—
			No Signal	2	0	—	—	5	10	—	—	—	—	—
			1000 Mu. V. Color Bars	2	0	—	—	5	30	—	—	—	—	—

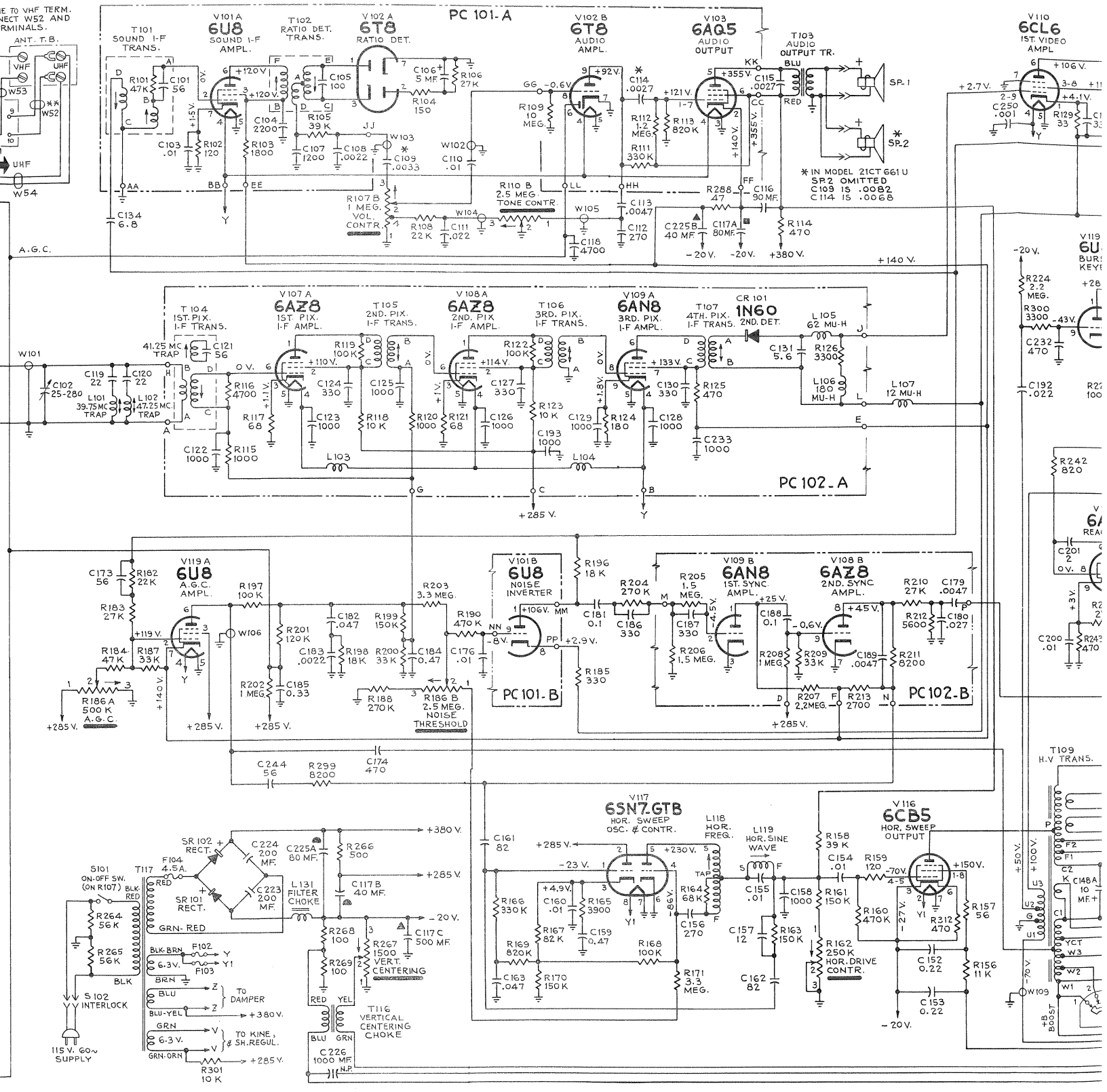
VOLTAGE CHART

Tube No.	Tube Type	Function	Operating Condition	E. Plate		E. Screen		E. Cathode		E. Grid		I Plate (ma.)	I Screen (ma.)	Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts			
V121A	6AZ8	Killer	1000 Mu. V. B&W Signal	8	50	—	—	7	0	9	−0.9	—	—	—
			No Signal	8	46	—	—	7	0	9	−0.8	—	—	—
			1000 Mu. V. Color Bars	8	134	—	—	7	0	9	−22	—	—	—
V121B	6AZ8	Band Pass Amplifier	1000 Mu. V. B&W Signal	1	225	2	225	3	0	6	−13	—	—	—
			No Signal	1	215	2	215	3	0	6	−12	—	—	—
			1000 Mu. V. Color Bars	1	230	2	230	3	0	6	−6	—	—	—
V122A	6AN8	Blanking Amplifier	1000 Mu. V. B&W Signal	1	260	—	—	3	4.5	2	−64	—	—	—
			No Signal	1	250	—	—	3	4.5	2	−66	—	—	—
V122B	6AN8	Reactance	1000 Mu. V. B&W Signal	6	295	7	125	9	3.2	8	0	—	—	—
			No Signal	6	280	7	122	9	3.0	8	0	—	—	—
			1000 Mu. V. Color Bars	6	290	7	125	9	3.0	8	0	—	—	—
V123	6AG7	Demodulator Driver	1000 Mu. V. B&W Signal	8	280	6	240	5	6.8	4	0	—	—	—
			No Signal	8	280	6	230	5	6.2	4	0	—	—	—
			1000 Mu. V. Color Bars	8	270	6	240	5	6.7	4	0	—	—	—
V124A	6AZ8	3.58 MC Oscillator	1000 Mu. V. B&W Signal	1	293	2	115	3	0	6	−10	—	—	—
			No Signal	1	280	2	110	3	0	6	−10	—	—	—
			1000 Mu. V. Color Bars	1	290	2	110	3	0	6	−10	—	—	—
V124B	6AZ8	"B-Y" Amplifier	1000 Mu. V. B&W Signal	8	250	—	—	7	44	9	37	—	—	—
			No Signal	8	245	—	—	7	44	9	37	—	—	—
			1000 Mu. V. Color Bars	8	245	—	—	7	44	9	37	—	—	—
V125A	12BH7	"R-Y" Demodulator	1000 Mu. V. B&W Signal	1	34	—	—	3	0	2	−22	—	—	—
			No Signal	1	35	—	—	3	0	2	−20	—	—	—
			1000 Mu. V. Color Bars	1	37	—	—	3	0	2	−21	—	—	—
V125B	12BH7	"G-Y" Demodulator	1000 Mu. V. B&W Signal	6	37	—	—	8	0	7	−22	—	—	—
			No Signal	6	37	—	—	8	0	7	−20	—	—	—
			1000 Mu. V. Color Bars	6	36	—	—	8	0	7	−21	—	—	—
V126	21AXP22	Kine-scope Red				3	470	4	210	2	135	—	—	—
		Kine-scope Green	No Signal	Ultor Anode	25,000	7	600	5	219	6	115	—	—	—
		Kine-scope Blue				11	430	13	220	12	155	—	—	—

CUT ALONG THIS LINE



OPERATION OF THIS RECEIVER OUTSIDE T
MOVED, INVOLVES A SHOCK HAZARD FROM
ON THE RECEIVER SHOULD NOT BE ATTE

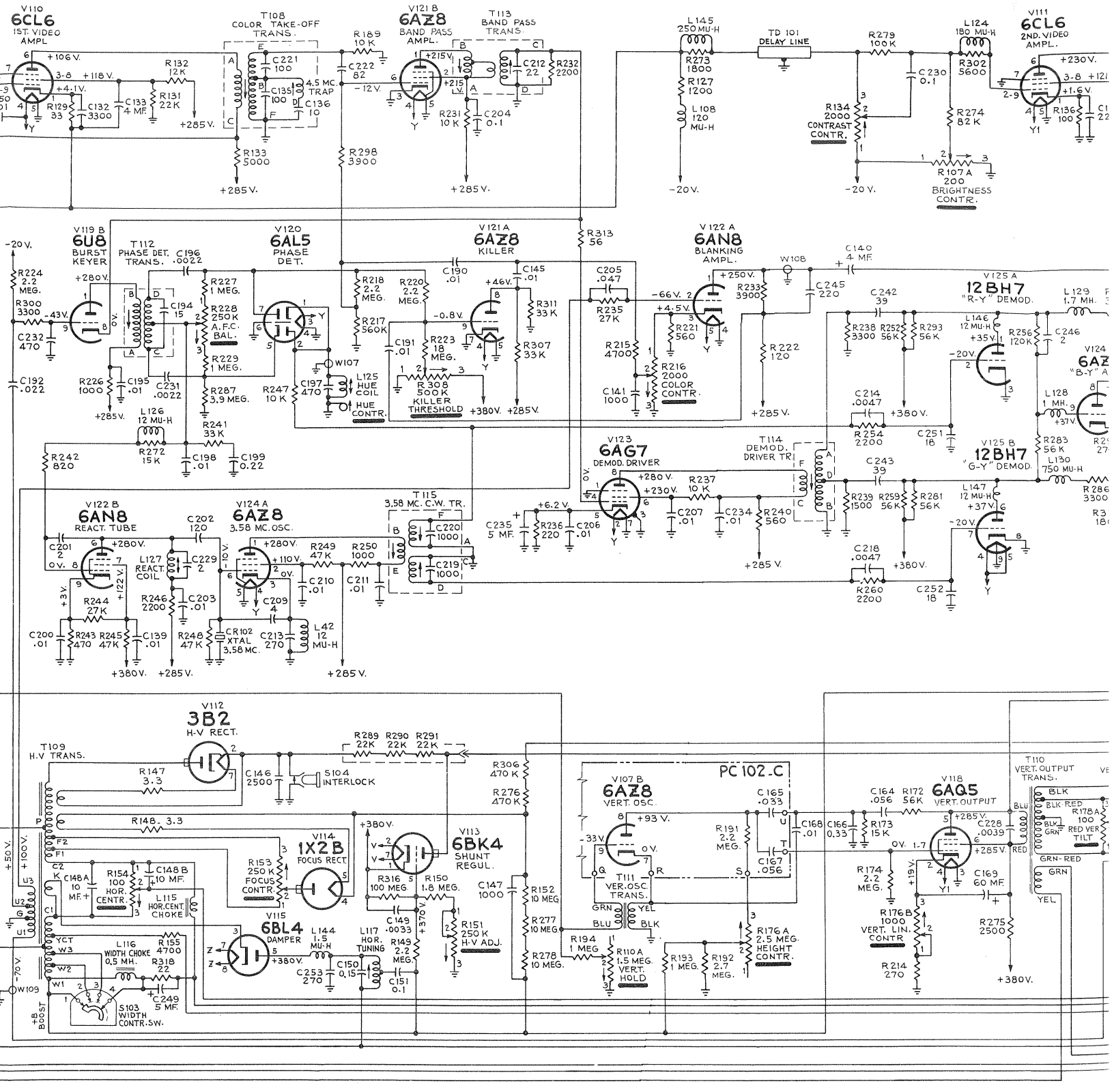


HIGH VOLTAGE WARN

THE CABINET OR WITH THE COVERS RE-
M THE RECEIVER POWER SUPPLIES. WORK
EMPTED BY ANYONE WHO IS NOT THOR-

OUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY
VOLTAGE EQUIPMENT. DO NOT OPERATE THE RECEIVER
COMPARTMENT COVER OPENED. BEFORE TURNING THE

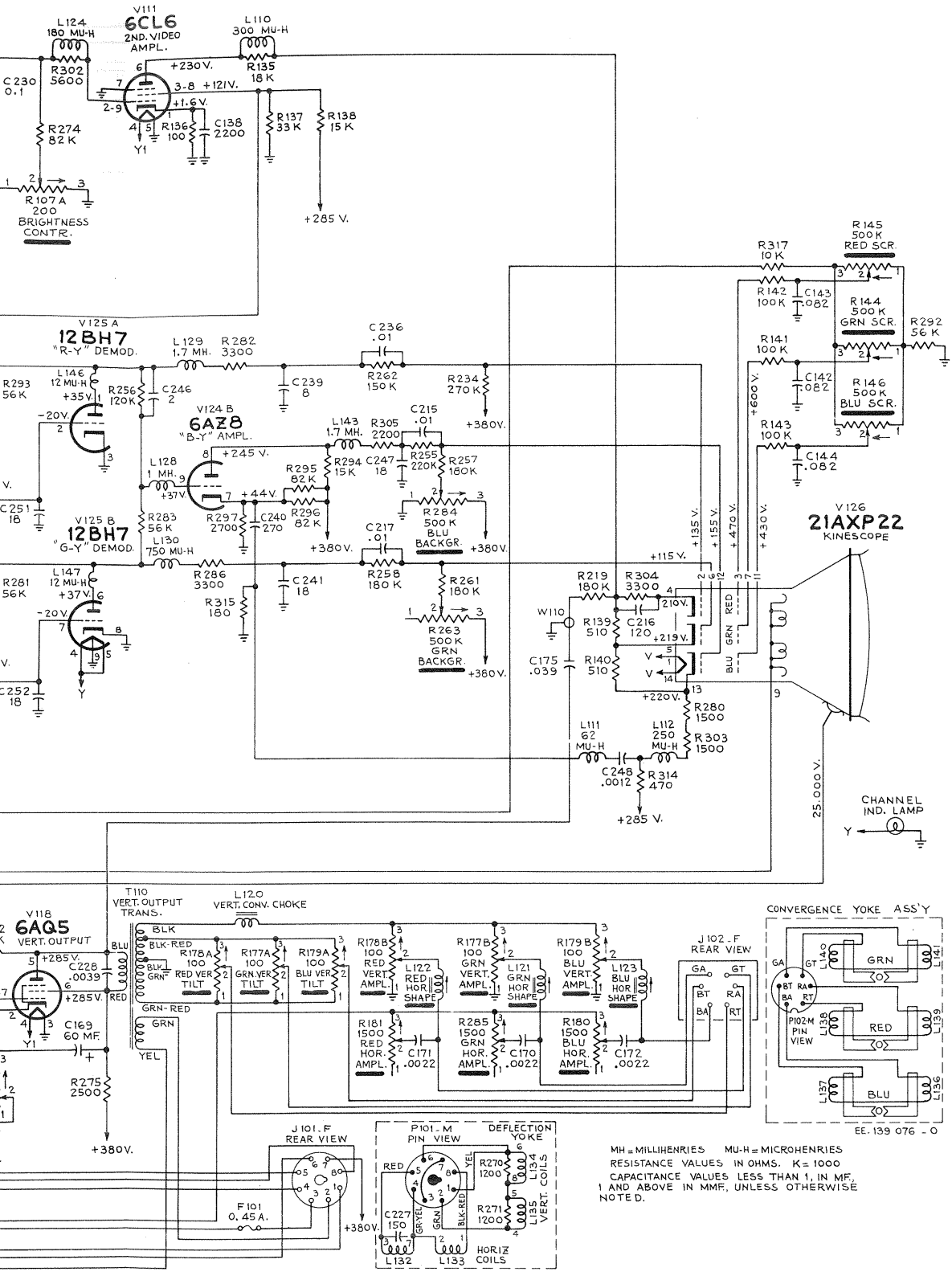
DIAGRAM CTC4 OR CTC4A



WARNING

ECESSARY WHEN WORKING ON HIGH
RECEIVER WITH THE HIGH VOLTAGE
ING THE RECEIVER ON, INSURE THAT

THE GROUND STRIP BETWEEN THE FRONT TRIM AND THE
TAINING ROD AND THE STRAP BETWEEN THE FRONT TRIM A
ARE FASTENED AND MAKING CONTACT. BE SURE THE GROU
THE FIELD EQUALIZING ASSEMBLY IS IN PLACE.



MH = MILLIHENRIES MU-H = MICROHENRIES
RESISTANCE VALUES IN OHMS. K = 1000
CAPACITANCE VALUES LESS THAN 1, IN MF. 1 AND ABOVE IN MMF, UNLESS OTHERWISE NOTED.

**T TRIM AND THE BOTTOM KINESCOPE RE-
THE FRONT TRIM AND THE CONTROL COVER
E SURE THE GROUND LEAD TO THE TOP OF
PLACE.**

All voltages measured with "VoltOhmyst" and with no signal input. Voltages should hold within ±20% with 117 v. a-c supply.

Direction of arrows at controls indicates clockwise rotation.

FIELD SERVICE DATA SHEET

21-CT-661U
21-CT-662U

INSTALLATION CHECK LIST

CAUTION: Removal of the rear cabinet screen actuates the H.V. interlock, grounding out the high voltage capacitor. Do not turn on the receiver with the interlock plug (on the rear screen) removed. To do so will result in failure of the H.V. fuse F101.

Connect the antenna transmission line to the receiver antenna terminals.

Plug the power cord into the 117V. AC outlet and turn the receiver "ON". The receiver should operate normally. However, a check of the following adjustments should be made.

1. Check the receiver on the strongest channel.

If the receiver is overloading it will be necessary to adjust the AGC and Noise Threshold controls.

Turn the Noise Threshold control R186B, on the chassis rear apron, fully counter-clockwise.

Select the channel with the strongest signal and turn the AGC control counter-clockwise until the receiver operates normally and the picture can be synchronized. (See rear view for adjustment location.)

Switch the receiver to the weakest signal to be received.

Turn the Noise Threshold control R186B clockwise until the best signal-to-noise ratio is obtained.

Select the strongest signal once again and check, that adjustment of the noise threshold control, did not cause overload. The noise threshold control should be set for best signal-to-noise without causing overload on strong signals.

2. Check for normal operation of horizontal (freq.) control. Should hold sync for three full turns or more of the control.

3. Check centering of picture. Adjustment is made with the centering controls on the rear apron.

4. Check width and horizontal linearity, readjust width switch only, for 3/4 inch overscan. Do not adjust drive and tuning controls. (Refer to Service Data alignment.)

5. Check height and vertical linearity, reset controls where required.

6. Check R-F oscillator adjustment on all channels. Readjust if necessary, starting at the highest frequency channel, proceeding to the lowest.

7. Adjust the FM trap—where FM interference is encountered—for minimum interference in the picture.

8. Adjust focus control for best definition in fine detail areas.

9. Check for reception of color, using transmitted color stripe if available in area where receiver is installed. This will also check antenna for color reception. A check of the receiver may be made using a color bar generator where the color stripe is not available.

10. Check for proper purity and convergence. Follow outline under "Complete Set-up Procedure" if adjustment is required.

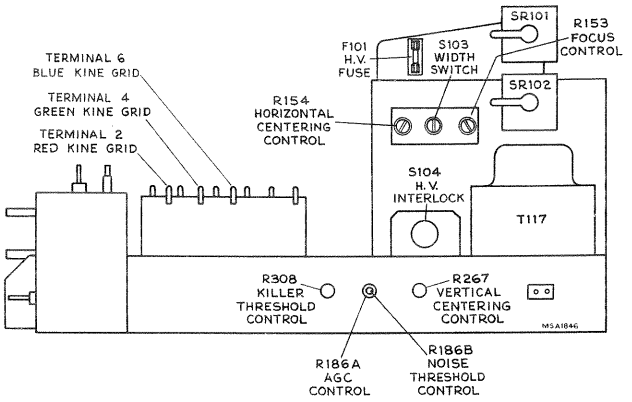
KINESCOPE AND SAFETY GLASS CLEANING.—The front safety glass may be removed to allow for cleaning of the kinescope faceplate and the safety glass.

To do this, remove the top panel of the receiver. There are a number of flat springs holding the cabinet front metal trim to the plastic kinescope mask.

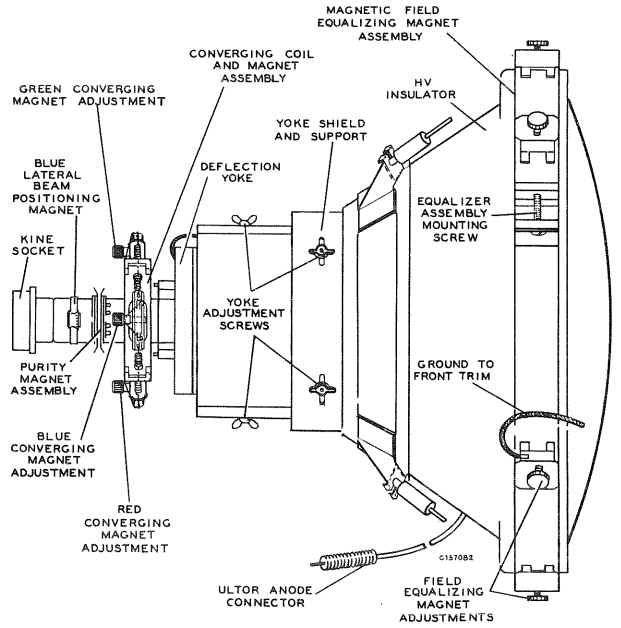
Reach over the top front of the receiver and press in on each spring at the open end. Slide the spring out of the slot provided. The front trim and safety glass should be held in position with the other hand to prevent its falling outward when removing the springs.

Remove the metal trim and the safety glass.

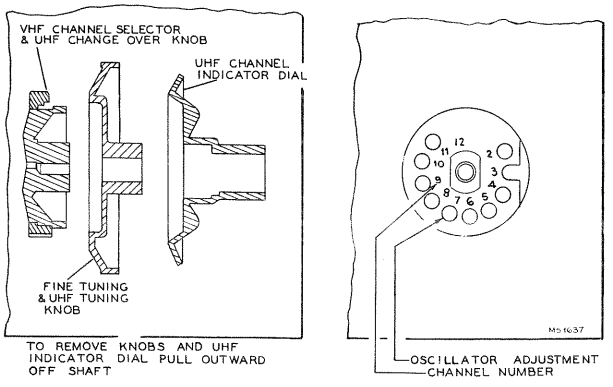
The kinescope faceplate and the safety glass should only be cleaned with a soft cloth and "Windex" or similar cleaning agent.



REAR CHASSIS ADJUSTMENTS



KINESCOPE ADJUSTMENTS AND COMPONENTS



VHF R-F OSCILLATOR ADJUSTMENT

21-CT-661U
21-CT-662U

FIELD SERVICE DATA SHEET

COMPLETE SET-UP PROCEDURE

Prior to making any picture adjustments, it is essential to have 25,000 volts applied to the ultor anode of the kinescope (see HIGH VOLTAGE & HORIZONTAL DEFLECTION ADJUSTMENT under ALIGNMENT PROCEDURE of Service Data).

INITIAL ADJUSTMENTS.—Adjust the receiver for a black and white picture.

At this point it is necessary to check the horizontal oscillator and the conventional adjustments of height, vertical linearity, width, focus, and electrical centering. (Refer to Check List).

PRELIMINARY CONVERGENCE ADJUSTMENT.—The dot signal generator should be connected to the receiver to provide a dot pattern on the kinescope for making convergence adjustments.

Preset the red, green and blue horizontal and vertical amplitude controls to minimum, fully counter-clockwise. Refer to convergence section view for control locations. Preset the red, green and blue vertical tilt controls to mid-range.

Adjust the three converging magnet adjustments and the blue beam-positioning magnet to produce a white dot in the center of the screen.

COLOR PURITY ADJUSTMENTS.—Set all the magnets on the field equalizing assembly at their maximum distance from the kinescope.

Set the contrast control fully counter-clockwise and the brightness control fully clockwise.

Set the red screen control to fully clockwise and the green and blue screen controls fully counter-clockwise.

Rotate one or both of the rings of the purifying magnet, by the tabs, or rotate the entire assembly, to achieve minimum color contamination of the red field. The yoke should also be adjusted by moving forward or backward on the kinescope neck.

The kinescope and associated components should be subjected to a strong magnetic field at this point using the degaussing coil. Slowly move the coil around the kinescope, the sides and front of the receiver and very slowly withdraw to about six feet before disconnecting the coil.

SCREEN ADJUSTMENTS.—Advance the green and blue screen controls and then adjust all three screen controls to produce a high-level white screen. Color contamination may be noted around the edges of the screen.

Adjust the individual field equalizing magnets adjacent to the area of contamination to produce the most uniform white field over the entire screen.

NOTE: Relocation of the receiver may disrupt the purity adjustments, if the receiver passes through the influence of stray magnetic fields. Purity should be checked at the location in which the instrument is to be operated.

KINESCOPE TEMPERATURE & BACKGROUND ADJUSTMENTS.—Tune in a normal black and white picture.

Set the blue and green background controls and the brightness control to the center of their ranges.

Turn the contrast control fully counter-clockwise.

Adjust the three screen controls to produce a ~~low~~-level grey screen. (The correct setting is for a ~~6500°~~ Kelvin gray screen.)

Advance the contrast control and observe the picture. One or more colors should predominate in the low-light areas.

Reduce this color(s) with the proper screen control and restore the grey screen with background controls.

Observe a high-light area and readjust the screen controls for a grey picture.

Continue the above adjustments until proper tracking is achieved between low-light and high-light areas, as the brightness control is adjusted through its range.

STATIC CONVERGENCE ADJUSTMENTS

Recheck the dot pattern for white dots in the center of the screen. If necessary, re the four magnet adjustments to again produce this condition. The center dots shou converged, with mis-convergence at the sides and at the top and bottom of the screen

DYNAMIC CONVERGENCE ADJUSTMENTS

VERTICAL CONVERGENCE.—Vertical dynamic convergence should be perf before horizontal convergence.

Referring to the vertical row of dots nearest the center of the screen, turn the red v amplitude control fully clockwise and adjust the red vertical tilt control for maximu placement of the red dots, from the cyan dots, at the center of the screen.

Turn the green vertical amplitude control fully clockwise and adjust the green v tilt control for maximum displacement of the green dots at the center of the scree direction of center displacement should be opposite to red. Shunt the blue grid of th scope (through 100,000 ohms to ground) at the chassis rear apron, to facilitate adjustr the red and green dot patterns.

Adjust red and green vertical amplitude and tilt controls to produce straight v lines of red and green dots equally displaced from each other along the entire v center line. Converge the two rows of dots using the red and green convergence r adjustments to produce a single vertical row of yellow dots. Should red and gre placement appear at the top and/or bottom of the row of dots, readjustment of red and vertical amplitude and tilt controls must be made to produce an entire vertical row of dots.

Remove the shunt from the blue grid and set the blue vertical amplitude contr clockwise. Alternately adjust the blue vertical tilt and amplitude controls until t placement of the blue dots are uniform with respect to the yellow dots, along the vertical center line. Using the blue convergence magnet and/or the blue beam posi magnet adjustments, the row of blue dots should now be moved to make the blue dots the row of yellow dots forming a single vertical row of white dots.

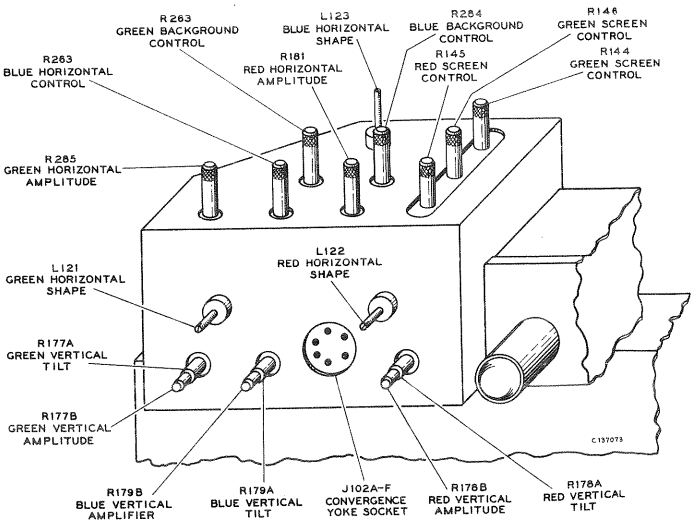
HORIZONTAL CONVERGENCE.—The procedure for horizontal converge approximately the same as that used for vertical convergence. The horizontal row nearest the center, however, is used for reference.

Turn the blue horizontal amplitude control fully clockwise. Adjust the blue ho phasing control to produce maximum downward displacement of the blue dots at the of the screen. Alternately adjust the blue horizontal phasing and amplitude con produce a straight horizontal line of blue dots across the center of the screen.

Shunt the red grid of the kinescope at the chassis rear apron. Alternately adj green horizontal amplitude and phasing controls to produce uniform displacement entire center line of green dots with respect to the center line of blue dots.

Shunt the blue kinescope grid at the chassis rear apron, and remove the shu the red grid of the kinescope. Adjust the red horizontal amplitude and phasing con produce uniform displacement of the center line of red dots with respect to the cen of green dots. Remove the shunt from the blue kinescope grid. The dots must now verged with the convergence magnet adjustments to form a single line of white dots this shunt the blue grid of the kinescope once more.

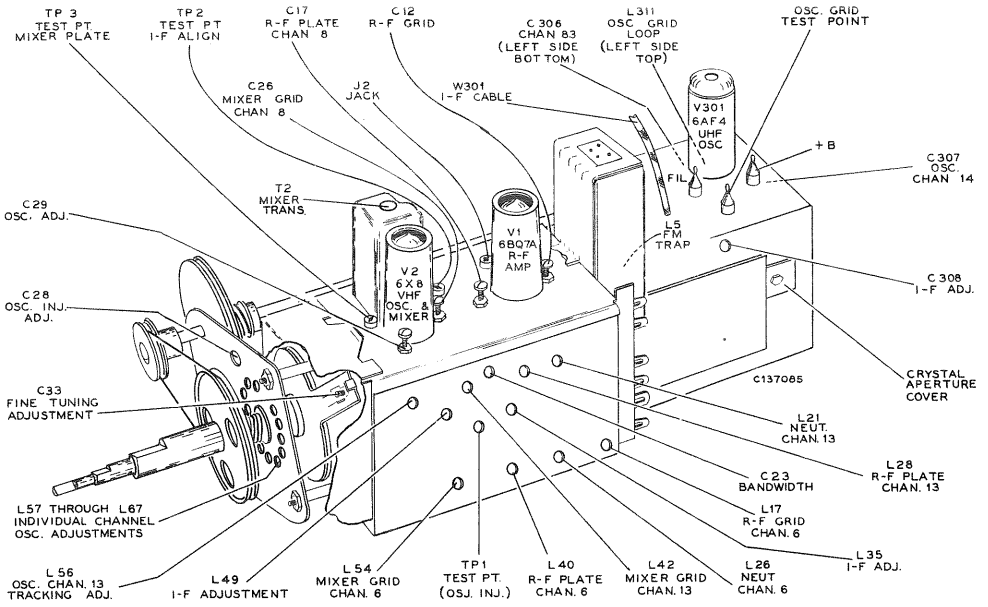
Adjust the green and red convergence magnet adjustments to converge the gre red dots along the horizontal center line producing a single center line of yello Remove the shunt from the blue kinescope grid. Adjust the blue convergence mag blue beam positioning magnet adjustments to move the blue dots onto the yello producing white dots.



CONVERGENCE SECTION ADJUSTMENTS

FIELD SERVICE DATA SHEET

21-CT-661U
21-CT-662U



REPLACEMENT PARTS (Partial Listing)

SYMBOL No.	STOCK No.	DESCRIPTION
C103	73960	Capacitor—Fixed, ceramic, .01 mf., +100% −0%, 500 v. DC. Part of PC101
C104	39660	Capacitor—Fixed, mica, 2200 mmf., ±5%, 500 v. DC. Part of PC101
C107	39654	Capacitor—Fixed, mica, 1200 mmf., ±5%, 500 v. DC. Part of PC101
C112	39638	Capacitor—Fixed, mica, 270 mmf., ±5%, 500 v. DC
C119	100924	Capacitor—Fixed, ceramic, 27 mmf., ±5%, 500 v. DC
C120	47948	Capacitor—Fixed, ceramic, 39 mmf., ±5%, 500 v. DC
C122, C123	78623	Capacitor—Fixed, ceramic, 1000 mmf., ±20%, 500 v. DC. Part of PC102
C124	79979	Capacitor—Fixed, ceramic, 330 mmf., ±20%, 500 v. DC. Part of PC102
C125, C126		Same as C122
C127		Same as C124
C128, C129		Same as C122
C130		Same as C124
C131	100374	Capacitor—Fixed, ceramic, 5.6 mmf., ±0.5 mmf., 500 v. DC non-insulated. Part of PC102
C132	39664	Capacitor—Fixed, mica, 3300 mmf., ±5%, 500 v. DC
C134	205183	Capacitor—Fixed, ceramic, 6.8 mmf., ±0.25 mmf., 500 v. DC
C137	100437	Capacitor—Fixed, mica, 150 mmf., ±10%, 500 v. DC
C138		Same as C104
C139		Same as C103
C141	39652	Capacitor—Fixed, mica, 1000 mmf., ±10%, 500 v. DC
C146	100398	Capacitor—Fixed, ceramic, high voltage, 2500 mmf., +50%, −20%, 30,000 volts
C147	100446	Capacitor—Fixed, ceramic, 1000 mmf., 5 K.V.
C156	79022	Capacitor—Fixed, mica, 270 mmf., ±20%, 1000 v. DC
C157	33380	Capacitor—Fixed, ceramic, 12 mmf., ±5%, 500 v. DC
C158		Same as C141
C161	76474	Capacitor—Fixed, mica, 82 mmf., ±10%, 1000 v. DC
C162	71514	Capacitor—Fixed, ceramic, ±5%, 82 mmf., 500 v. DC
C173	71924	Capacitor—Fixed, ceramic, 56 mmf., ±10%, 500 v. DC
C174	77673	Capacitor—Fixed, ceramic, 470 mmf., ±10%, 1500 v. DC
C176		Same as C103
C186	79191	Capacitor—Fixed, mica, 330 mmf., ±5%, 500 v. DC
C187	39640	Capacitor—Fixed, mica, 330 mmf., ±10%, 500 v. DC. Part of PC102
C193		Same as C122
C195		Same as C103
C201	79992	Capacitor—Fixed, ceramic, 2 mmf., ±0.25 mmf., 500 v. DC
C202	71614	Capacitor—Fixed, ceramic, 120 mmf., ±5%, 500 v. DC
C203		Same as C103
C206		Same as C103
C209	100926	Capacitor—Fixed, ceramic, 4 mmf., ±0.25 v. DC
C210, C211		Same as C103
C213		Same as C112
C215		Same as C103; Part of Video board
C216		Same as C202
C222		Same as C162
C229	100925	Capacitor—Fixed, ceramic, 2 mmf., ±0.25 v. DC
C233		Same as C122; Part of PC102
C234		Same as C103
C236		Same as C103; Part of Video board
C237, C238		Same as C103
C239	78228	Capacitor—Fixed, ceramic, 8 mmf., ±.5 v. DC; Part of Video board
C240	59483	Capacitor—Fixed, mica, 270 mmf., ±10 DC
C241	39041	Capacitor—Fixed, ceramic, 18 mmf., ± DC; Part of Video board
C242, C243	73664	Capacitor—Fixed, ceramic, 39 mmf., ±1 DC
C244		Same as C173
C245	39636	Capacitor—Fixed, mica, 220 mmf., ±10%
C246		Same as C229
C247		Same as C241
CR101	76675	Rectifier—Picture detector crystal recti PC102
CR102	100449	Crystal—3.58 M.C. crystal
F101	79798	Fuse—.45 amp. fuse
F102, F103	79358	Fuse—Heater fuse assembly with magn glass sleeve
F104	79357	Fuse—Glass fuse, 4.5 amps., 250 v.
R107A, B	100383	Control—"On-Off" volume and brightn Includes S101
R110A, B	100384	Control—Vertical hold and tone control
R133	100443	Resistor—Fixed, w.w., 5000 ohms, ±10
R134	100381	Control—Contrast control
R144 to R146 Incl.	100391	Control—Screen and background contr
R147, R148	100928	Resistor—Fixed, w.w., 3.3 ohms, ±5%,
R151	100387	Control—Horizontal drive, high voltage and AFC balance control
R153	100396	Control—Focus control
R154	100395	Control—Horizontal centering control
R156	79987	Resistor—Fixed, w.w., 11,000 ohms, ±1
R162		Same as R151
R176A, B	100390	Control—Vertical, height and linearity
R177A, B to R179A, B Incl.	100388	Control—Vertical amplitude and tilt con
R180, R181	100392	Control—Horizontal amplitude controls
R186A, B	100389	Control—AGC noise invertor control
R216	100382	Control—Color control
R228		Same as R151
R263		Same as R144
R266	100304	Resistor—Fixed, w.w., 500 ohms, ±10%
R267	100386	Control—Vertical centering control

KRK
TUNI

NTS
en. If necessary, readjust
e center dots should be
ottom of the screen.

NTS
ce should be performed

een, turn the red vertical
control for maximum dis-
screen.
adjust the green vertical
center of the screen. The
the blue grid of the kine-
to facilitate adjustment of

produce straight vertical
along the entire vertical
een convergence magnet
ould red and green dis-
justment of red and green
tire vertical row of yellow

al amplitude control fully
de controls until the dis-
w dots, along the entire
he blue beam positioning
make the blue dots fall on

orizontal convergence is
he horizontal row of dots

djust the blue horizontal
the blue dots at the center
nd amplitude controls to
f the screen.
n. Alternately adjust the
iform displacement of the
blue dots.
d remove the shunt from
e and phasing controls to
respect to the center line
he dots must now be con-
e line of white dots. To do

converge the green and
enter line of yellow dots.
convergence magnet and
dots onto the yellow dots,

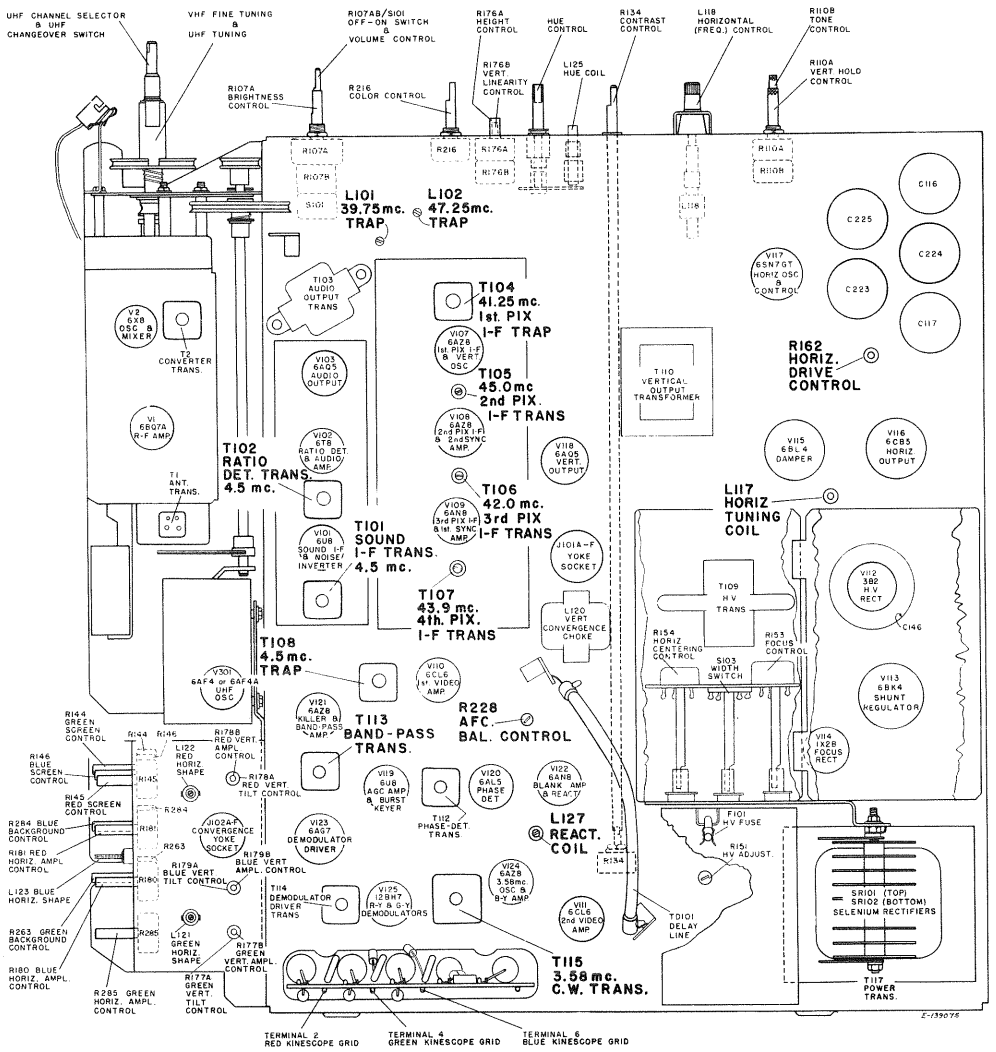
ENTS

21-CT-661U
21-CT-662U

FIELD SERVICE DATA SHEET

KRK 37
TUNER

SYMBOL No.	STOCK No.	DESCRIPTION
R275	100444	Resistor—Fixed, w.w., 2500 ohms, ±10%, 7 w.
R284		Same as R144
R285		Same as R180
R308	78808	Control—Killer threshold control
SR101, SR102	100412	Rectifier—High voltage selenium rectifier
T109	100409	Transformer—High voltage transformer
T110	100428	Transformer—Vertical output transformer
T111	79379	Transformer—Vertical blocking oscillator transformer
T117	100432	Transformer—Power transformer
TD101	100451	Line—Delay line
		MISCELLANEOUS
	100434	Board—Antenna terminal board assembly
	100407	Knob—High voltage insulator knob—nylon—with screw driver slot
	79533	Knob—Horizontal frequency and sine wave coil knob
	79506	Escutcheon—Channel marker escutcheon
	79470	Knob—Brightness control knob—brown maroon—for mahogany instruments
	79444	Knob—Brightness control knob—deep umber gray—for blonde tropical hardwood instruments
	79508	Knob—Channel selector knob—maroon—for mahogany instruments
	79509	Knob—Channel selector knob—sandtone—for blonde tropical hardwood instruments
	79465	Knob—Fine tuning control knob
	79471	Knob—"On-Off" volume control knob—brown maroon—for mahogany instruments
	79445	Knob—"On-Off" volume control knob—sandtone—for blonde tropical hardwood instruments
	75945	Knob—Tone and contrast control knob—maroon
	11891	Lamp—Mazda 44 pilot lamp
	100711	Yoke—Deflection yoke assembly complete with 8 contact male connector



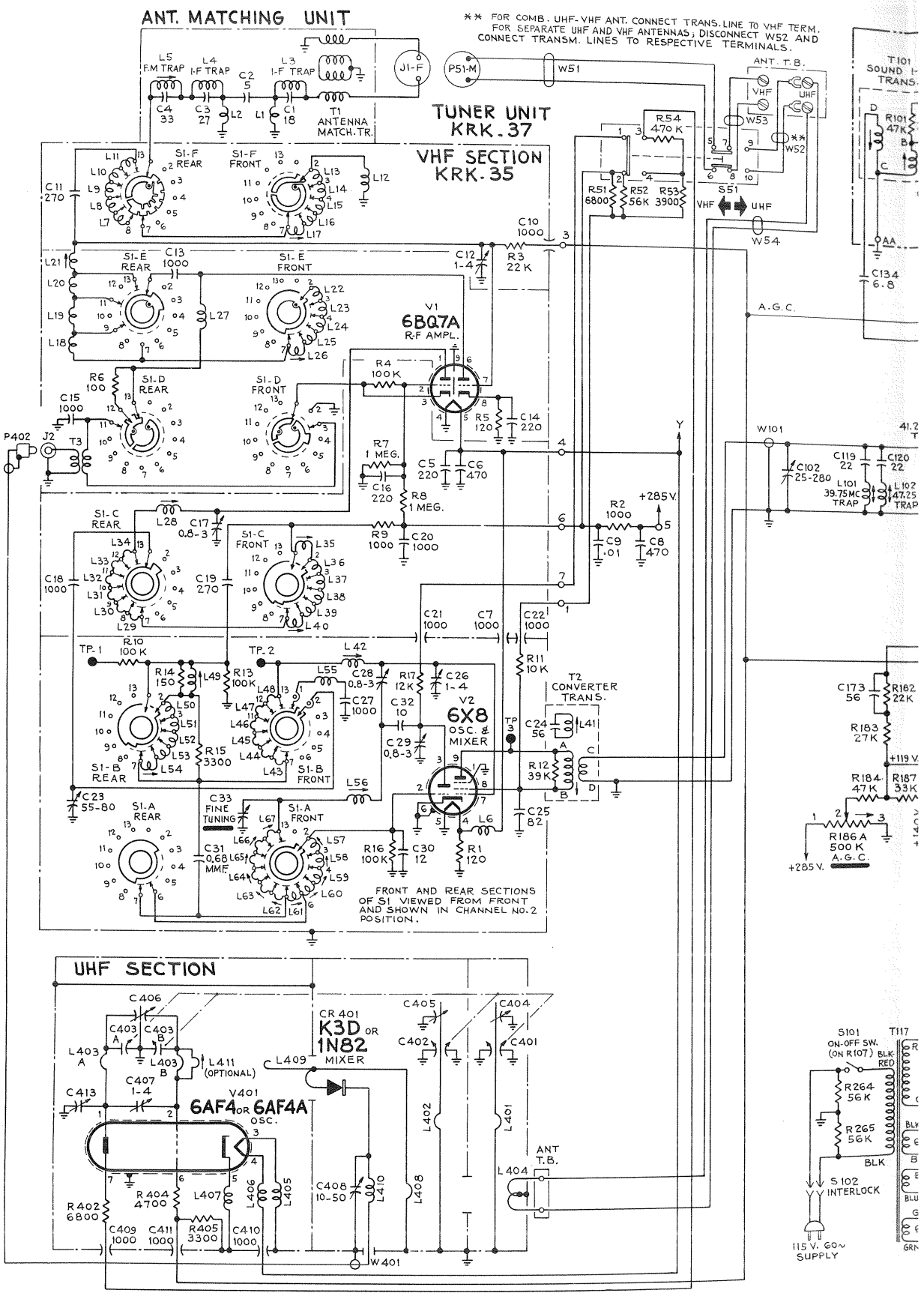
CHASSIS TOP VIEW

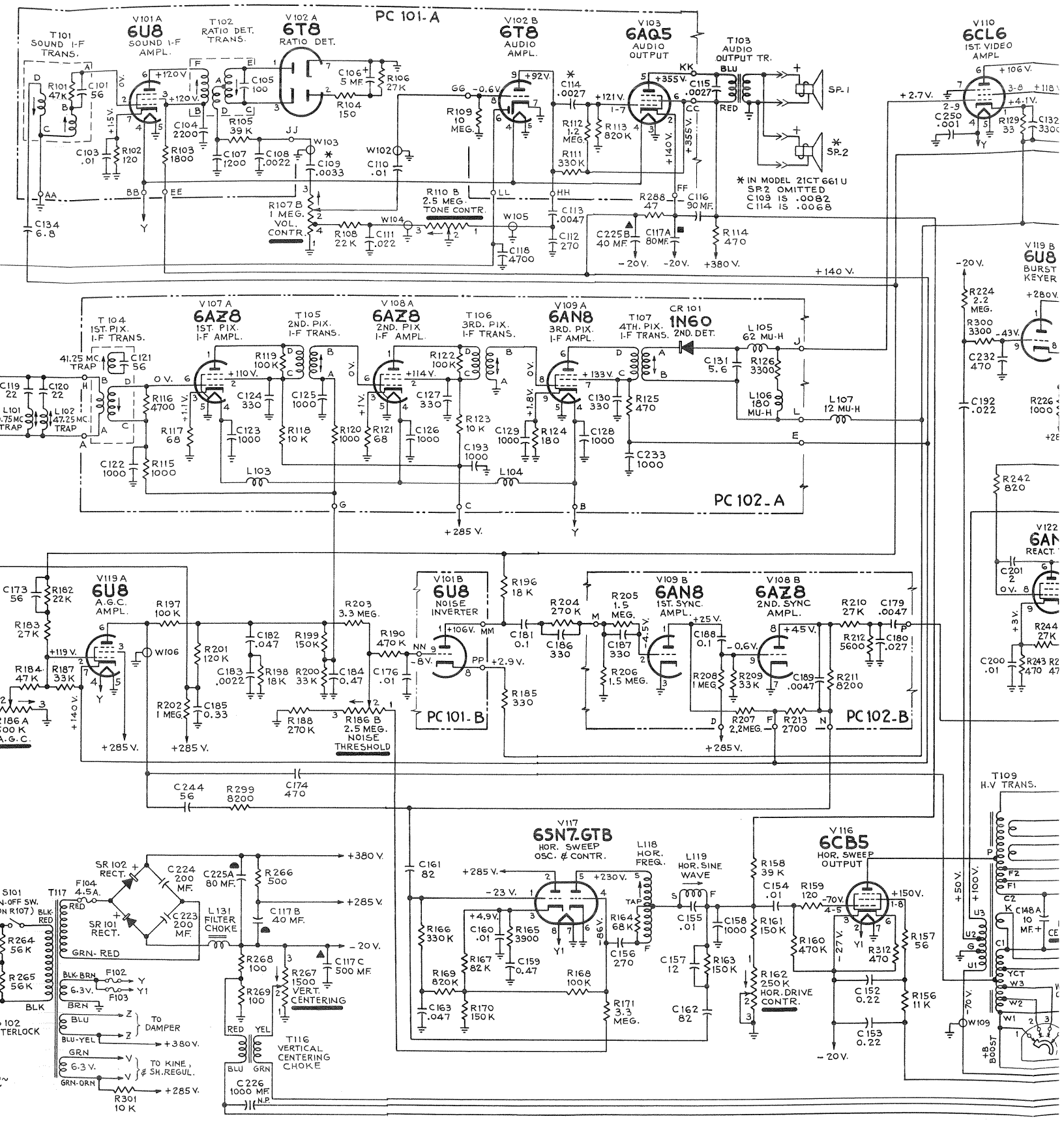
PREPARED BY COMMERCIAL SERVICE SECTION
RCA SERVICE CO., INC.
CAMDEN 8, N. J.
FOR

RADIO CORPORATION OF AMERICA
RCA VICTOR TELEVISION DIVISION

First Edition—First Printing 5-4-55

Printed in U. S. A.

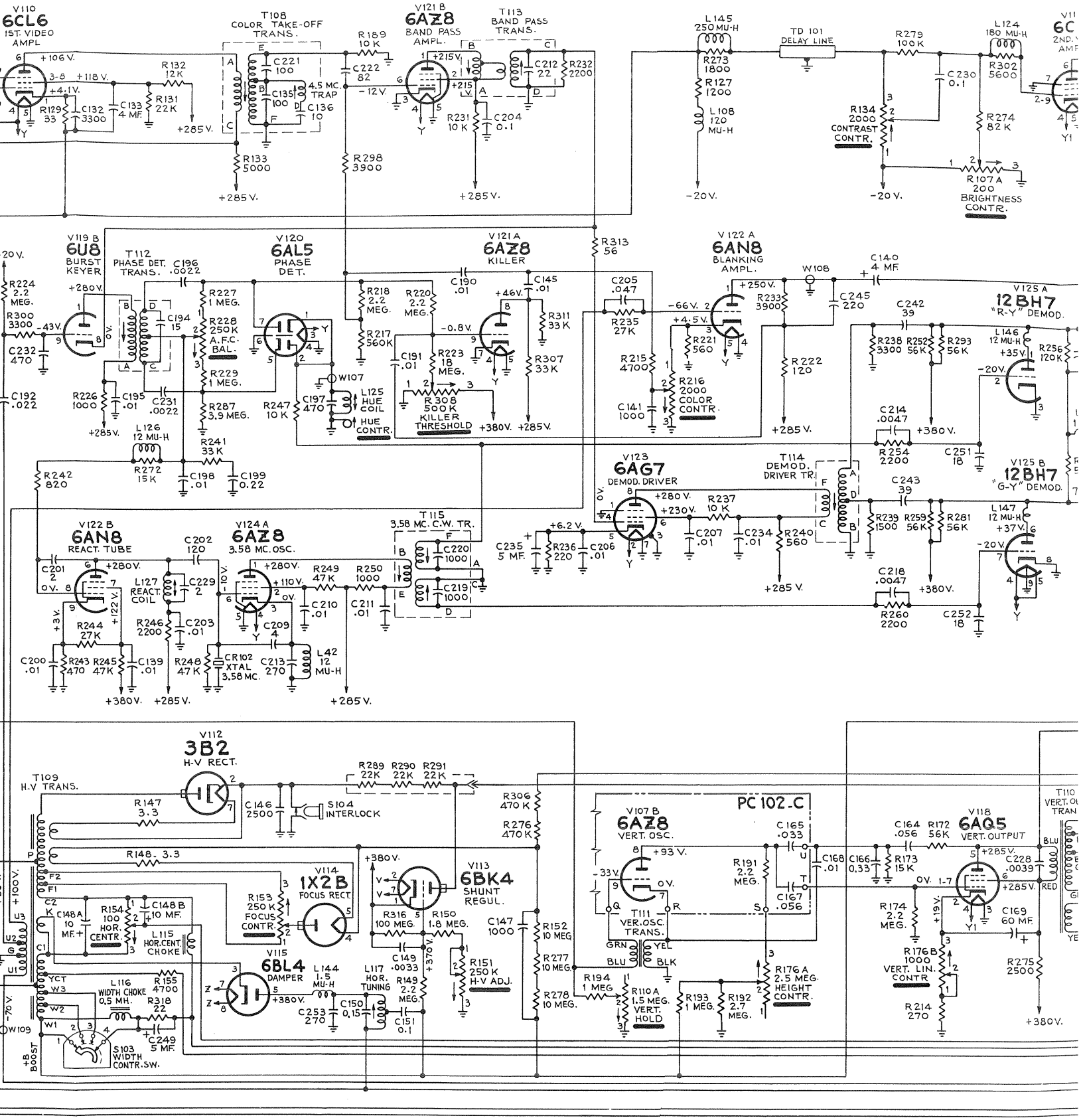

ANT. MATCHING UNIT
** FOR COMB. UHF-VHF ANT. CONNECT TRANS. LINE TO VHF TERM. FOR SEPARATE UHF AND VHF ANTENNAS, DISCONNECT W52 AND CONNECT TRANSM. LINES TO RESPECTIVE TERMINALS.
TUNER UNIT KRK-37
VHF SECTION KRK-35
UHF SECTION
V1 6BQ7A R-F AMPL.
V2 6X8 OSC. & MIXER
V401 6AF4 OR 6AF4A OSC.
CR401 K3D OR 1N82 MIXER
T2 CONVERTER TRANS.
ANT. T.B.
A.G.C.
+285V
+119V
FRONT AND REAR SECTIONS OF S1 VIEWED FROM FRONT AND SHOWN IN CHANNEL NO. 2 POSITION.
S101 ON-OFF SW. (ON R107)
S102 INTERLOCK
115 V. 60~ SUPPLY



All capacitance values less than 1 in MF and above 1 in MMF unless otherwise noted. All resistance values in ohms. K = 1000.

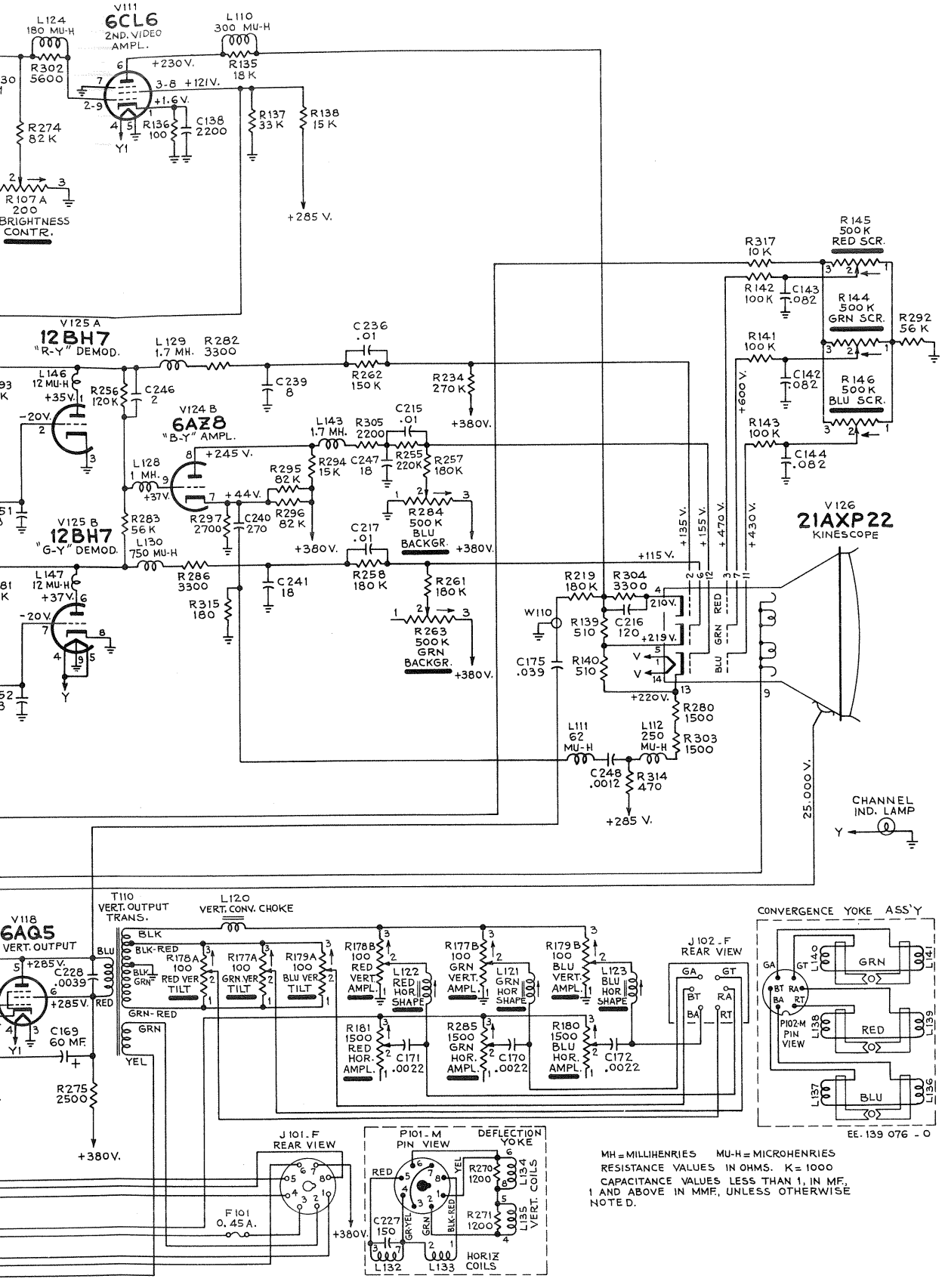
Direction of arrows at clockwise rotation.

ATIC DIAGRAM CTC4 OR CTC4A



on of arrows at controls indicates
e rotation.

All voltages measured with "Volt-Ohmyst" and no signal input. Voltages should hold within ±20% with 117 v. a-c supply.



MH = MILLIHENRIES MU-H = MICROHENRIES
RESISTANCE VALUES IN OHMS. K = 1000
CAPACITANCE VALUES LESS THAN 1, IN MF, 1 AND ABOVE IN MMF, UNLESS OTHERWISE NOTED.

Figure 33—Circuit Schematic Diagram CTC4 or CTC4A

SYMBOL No.	STOCK No.	DESCRIPTION
R104	502115	Resistor—Fixed, composition, 150 ohms, ±5%, ½ w. Part of PC101
R105	502339	Resistor—Fixed, composition, 39,000 ohms, ±10%, ½ w. Part of PC101
R106	502327	Resistor—Fixed, composition, 27,000 ohms, ±10%, ½ w. R106—Part of PC101
R107A, B	100383	Control—"On-Off" volume and brightness control; Includes S101
R108	502322	Resistor—Fixed, composition, 22,000 ohms, ±10%, ½ w.
R109	502610	Resistor—Fixed, composition, 10 megohm, ±20%, ½ w. Part of PC101
R110A, B	100384	Control—Vertical hold and tone control
R111	502433	Resistor—Fixed, composition, 330,000 ohms, ±10%, ½ w. R111—Part of PC101
R112	502515	Resistor—Fixed, composition, 1.5 megohm, ±5%, ½ w. R112—Part of PC101
R113	502482	Resistor—Fixed, composition, 820,000 ohms, ±10%, ½ w. R113—Part of PC101
R114	522147	Resistor—Fixed, composition, 470 ohms, ±10%, 2 w.
R115	502210	Resistor—Fixed, composition, 1000 ohms, ±10%, ½ w. R115—Part of PC102
R116	502247	Resistor—Fixed, composition, 4700 ohms, ±5%, ½ w. R116—Part of PC102
R117	502068	Resistor—Fixed, composition, 68 ohms, ±5%, ½ w. Part of PC102
R118	522310	Resistor—Fixed, composition, 10,000 ohms, ±10%, 2 w. R118—Part of PC102
R119	502410	Resistor—Fixed, composition, 100,000 ohms, ±5%, ½ w. R119—Part of PC102
R120		Same as R115—Part of PC102
R121		Same as R117—Part of PC102
R122		Same as R119—Part of PC102
R123		Same as R118—Part of PC102
R124	502118	Resistor—Fixed, composition, 180 ohms, ±5%, ½ w. R124—Part of PC102
R125	502147	Resistor—Fixed, composition, 470 ohms, ±10%, ½ w. Part of PC102
R126	502233	Resistor—Fixed, composition, 3300 ohms, ±5%, ½ w. Part of PC102—R126
R127	512212	Resistor—Fixed, composition, 1200 ohms, ±5%, 1 w.
R129	502033	Resistor—Fixed, composition, 33 ohms, ±10%, ½ w.
R131	522322	Resistor—Fixed, composition, 22,000 ohms, ±10%, 2 w.
R132	522312	Resistor—Fixed, composition, 12,000 ohms, ±10%, 2 w.
R133	100443	Resistor—Fixed, w.w., 5000 ohms, ±10%, 10 w.
R134	100381	Control—Contrast control
R135	502318	Resistor—Fixed, composition, 18,000 ohms, ±10%, ½ w.
R136	502110	Resistor—Fixed, composition, 100 ohms, ±10%, ½ w.
R137, R138	522315	Resistor—Fixed, composition, 15,000 ohms, ±5%, 2 w.
R139, R140	512151	Resistor—Fixed, composition, 510 ohms, ±5%, 1 w. Part of Video board
R141 to R143 Incl.	522410	Resistor—Fixed, composition, 100,000 ohms, ±10%, 2 w. Part of Video board—R141 to R143 Incl.
R144 to R146 Incl.	100391	Control—Screen and background controls
R147, R148	100928	Resistor—Fixed, w.w., 3.3 ohms, ±5%, ½ w.
R149	512522	Resistor—Fixed, composition, 2.2 megohms, ±5%, 1 w.
R150	512518	Resistor—Fixed, composition, 1.8 megohms, ±5%, 1 w.
R151	100387	Control—Horizontal drive, high voltage adjustment and AFC balance control
R152	522610	Resistor—Fixed, composition, 10 megohms, ±20%, 2 w.
R153	100396	Control—Focus control
R154	100395	Control—Horizontal centering control
R155	512247	Resistor—Fixed, composition, 4700 ohms, ±5%, 1 w.
R156	79987	Resistor—Fixed, w.w., 11,000 ohms, ±10%, 10 w.
R157	502056	Resistor—Fixed, composition, 56 ohms, ±10%, ½ w.
R158	512339	Resistor—Fixed, composition, 39,000 ohms, ±10%, 1 w.
R159		Same as R102
R160	502447	Resistor—Fixed, composition, 470,000 ohms, ±10%, ½ w.
R161	502415	Resistor—Fixed, composition, 150,000 ohms, ±10%, ½ w.
R162		Same as R151
R163		Same as R161
R164	502368	Resistor—Fixed, composition, 68,000 ohms, ±10%, ½ w.
R165	502239	Resistor—Fixed, composition, 3900 ohms, ±10%, ½ w.
R166		Same as R111
R167	512382	Resistor—Fixed, composition, 82,000 ohms, ±10%, 1 w.
R168	512410	Resistor—Fixed, composition, 100,000 ohms, ±5%, 1 w.
R169		Same as R113
R170	512415	Resistor—Fixed, composition, 150,000 ohms, ±5%, 1 w.
R171	502533	Resistor—Fixed, composition, 3.3 megohms, ±10%, ½ w.
R172	522339	Resistor—Fixed, composition, 39,000 ohms, ±10%, 2 w.
R173	502315	Resistor—Fixed, composition, 15,000 ohms, ±5%, ½ w.
R174	502522	Resistor—Fixed, composition, 2.2 megohm, ±5%, ½ w.
R176A, B	100390	Control—Vertical, height and linearity control
R177A, B to R179A, B Incl.	100388	Control—Vertical amplitude and tilt controls
R180, R181	100392	Control—Horizontal amplitude controls
R182		Same as R108
R183		Same as R106
R184	502347	Resistor—Fixed, composition, 47,000 ohms, ±10%, ½ w.
R185	502133	Resistor—Fixed, composition, 330 ohms, ±10%, ½ w.
R186A, B	100389	Control—AGC noise invertor control
R187	502333	Resistor—Fixed, composition, 33,000 ohms, ±5%, ½ w.
R188	502427	Resistor—Fixed, composition, 270,000 ohms, ±10%, ½ w.
R189	502310	Resistor—Fixed, composition, 10,000 ohms, ±10%, ½ w.
R190		Same as R160.
R191		Same as R174—Part of PC102
R192		Same as R160
R193	522527	Resistor—Fixed, composition, 2.7 megohms, ±10%, 2 w.
R194	502510	Resistor—Fixed, composition, 1.0 megohm, ±5%, ½ w.
R196		Same as R135
R197		Same as R141
R198		Same as R135
R199		Same as R161
R200		Same as R187
R201	502412	Resistor—Fixed, composition, 120,000 ohms, ±5%, ½ w.
R202		Same as R194.
R203		Same as R171
R204		Same as R188
R205 to R207 Incl.		Same as R112—Part of PC102
R208		Same as R194—Part of PC102
R209	502356	Resistor—Fixed, composition, 56,000 ohms, ±5%, ½ w. R209—Part of PC102
R210		Same as R106—Part of PC102
R211	512282	Resistor—Fixed, composition, 8200 ohms, ±5%, 1 w. Part of PC102
R212	502256	Resistor—Fixed, composition, 5600 ohms, ±10%, ½ w. R212—Part of PC102
R213	502227	Resistor—Fixed, composition, 2700 ohms, ±10%, ½ w. Part of PC102
R214	512127	Resistor—Fixed, composition, 270 ohms, ±10%, 1 w.
R215		Same as R116
R216	100382	Control—Color control
R217	502456	Resistor—Fixed, composition, 560,000 ohms, ±5%, ½ w.
R218		Same as R174
R219	512418	Resistor—Fixed, composition, 180,000 ohms, ±10%, 1 w.
R220		Same as R174
R221	502156	Resistor—Fixed, composition, 560 ohms, ±10%, ½ w.
R222		Same as R102
R223	502618	Resistor—Fixed, composition, 18 megohms, ±5%, ½ w.
R224		Same as R174.
R226		Same as R115
R227		Same as R194
R228		Same as R151
R229		Same as R194
R231		Same as R118
R232	502222	Resistor—Fixed, composition, 2200 ohms, ±10%, ½ w.

SYMBOL No.	STOCK No.	DESCRIPTION
		TUNER UNIT ASSEMBLY KRK-37 *(VHF Section)*
C1 to C4 Incl.		Part of T1
C5	100672	Capacitor—Fixed, ceramic, 220 mmf., ±20%, 500 v. DC
C6	77293	Capacitor—Fixed, ceramic, 470 mmf., +100 −10%, 500 v. DC
C7	77084	Capacitor—Feed thru, 1000 mmf.
C8		Same as C6
C9	73960	Capacitor—Fixed, ceramic, 10,000 mmf., +100 −0%, 500 v.
C10		Same as C7
C11	77838	Capacitor—Fixed, ceramic, 270 mmf., ±10%, 500 v. DC. Part of S1F
C12	76532	Trimmer—Adjustable trimmer, 1-4 mmf.
C13	77252	Capacitor—Fixed, ceramic, 1000 mmf., +100 −10%, 500 v. DC. C13—Part of S1E
C14		Same as C5
C15		Same as C13—Part of S1D
C16		Same as C5
C17	77151	Trimmer—Adjustable, tubular, 0.8-3.0 mmf.
C18		Same as C13—Part of S1C
C19	77838	Capacitor—Fixed, ceramic, 270 mmf., ±10%, 500 v. DC. Part of S1B
C20		Same as C13—Part of S1C
C21, C22		Same as C7
C23	79551	Trimmer—Adjustable trimmer, 55-80 mmf.
C24		Part of T1
C25	78603	Capacitor—Fixed, ceramic, 82 mmf., ±10%, 500 v. DC
C26	100671	Trimmer—Adjustable trimmer, 1-4 mmf.
C27		Same as C13—Part of S1B
C28	77913	Trimmer—0.8-3 mmf.
C29	79192	Trimmer—Variable trimmer, 0.8-3 mmf.
C30	33380	Capacitor—Fixed, ceramic, 12 mmf., ±10%, 500 v.
C31	71504	Capacitor—Fixed, headed lead type, 0.68 mmf., ±20%, 500 v. DC. Part of S1B
C32	100662	Capacitor—Fixed, ceramic, 10 mmf., ±10%, 500 v.
L1 to L4 Incl.		Part of T1
L6	76763	Reactor—Filament choke coil
L7	71469	Coil—Channel #8 or channel #10 coil—Part of S1F
L8	100690	Coil—Channel #9 coil—Part of S1F
L9		Same as L7
L10	72552	Coil—Channel #11 coil—Part of S1F
L11	79727	Coil—Channel #12 coil—Part of S1F
L12		Part of S1F
L13, L14	100689	Coil—Channel #2 or #3 coil—Part of S1F
L15	100692	Coil—Channel #4 coil—Part of S1F
L16	100691	Coil—Channel #5 coil—Part of S1F
L17	73461	Coil—Channel #6 coil—Part of S1F
L18 to L20 Incl.	100687	Coil—Channel #7 to channel #12 coil (3 req'd)—Part of S1E
L21	100681	Coil—Channel #13 coil—Part of S1E
L22	100683	Coil—Channel #2 coil—Part of S1E
L23	100684	Coil—Channel #3 coil—Part of S1E
L24	100685	Coil—Channel #4 coil—Part of S1E
L25	100686	Coil—Channel #5 coil—Part of S1E
L26	100678	Coil—Channel #6 coil and form assembly—Part of S1E
L27	100679	Coil—R.F. choke coil
L28	100682	Coil—Channel #13 coil assembly—Part of S1C
L29 to L34 Incl.		Part of S1C
L35	100675	Coil—Channel #1 coil assembly—Part of S1C
L36	79717A	Coil—Channel #2 coil—Part of S1C
L37, L38	79727	Coil—Channel #3 or #4 coil—Part of S1C
L39	79732	Coil—Channel #5 coil—Part of S1C
L40	73460	Coil—Channel #6 coil assembly—Part of SC1
L42	100680	Coil—Channel #13 coil assembly—Part of S1B
L43 to L48 Incl.		Part of S1B
L49	100676	Coil—Channel #1 coil—Part of S1B
L50	79727	Coil—Channel #2 coil—Part of S1B
L51, L52	71469	Coil—Channel #3 or #4 coil—Part of S1B
L53	100688	Coil—Channel #5 coil—Part of S1B
L54	73874	Coil—Channel #6 coil assembly—Part of S1B
L55	100679	Coil—Mixer stator coil—Part of S1B
R1	502112	Resistor—Fixed, composition, 120 ohms, ±10%, ½ w.
R2	512210	Resistor—Fixed, composition, 1000 ohms, ±20%, 1 w.
R3	502322	Resistor—Fixed, composition, 22,000 ohms, ±20%, ½ w.
R4	502410	Resistor—Fixed, composition, 100,000 ohms, ±20%, ½ w.
R5		Same as R1
R6	502110	Resistor—Fixed, composition, 100 ohms, ±20%, ½ w. Part of S1D
R7, R8	502510	Resistor—Fixed, composition, 1 megohm, ±10%, ½ w.
R9	502210	Resistor—Fixed, composition, 1000 ohms, ±20%, ½ w. Part of S1C
R10	502410	Resistor—Fixed, composition, 100,000 ohms, ±20%, ½ w. Part of S1B
R11	512310	Resistor—Fixed, composition, 10,000 ohms, ±10%, 1 w.
R12		Part of T2
R13		Same as R10
R14	502115	Resistor—Fixed, composition, 150 ohms, ±10%, ½ w. Part of S1B
R15	502233	Resistor—Fixed, composition, 3300 ohms, ±10%, ½ w. Part of S1B
R16		Same as R4
R17	522312	Resistor—Fixed, composition, 12,000 ohms, ±10%, 2 w.
R51	522268	Resistor—Fixed, composition, 6800 ohms, ±10%, 2 w.
R52	502356	Resistor—Fixed, composition, 56,000 ohms, ±10%, ½ w.
R53	502239	Resistor—Fixed, composition, 3900 ohms, ±10%, ½ w.
R54	502447	Resistor—Fixed, composition, 470,000 ohms, ±20%, ½ w.
S1A	100693	Stator—Oscillator stator assembly complete—Includes L56 to L67 Incl.
S1B	100695	Stator—Mixer grid stator assembly complete with rotor. Includes C14, C27, C31, L42 to L55 Incl., R10, R13 to R15 Incl.
S1C	100694	Stator—R. F. plate stator assembly complete with rotor. Includes C18, C20, L28 to L40 Incl., R9
S1D	100696	Stator—I.F. coil and stator assembly with rotor. Includes C15, R6, L27, T3
S1E	100698	Stator—Neutralizing coil & stator assembly complete with rotor; Includes C13, L18 to L26 Incl.
S1F	100697	Stator—Antenna coil & stator assembly complete with rotor. Includes C11, L7 to L17 Incl.
S51	100619	Switch—Antenna slide switch assembly
T1	100454	Transformer—Antenna matching transformer. Includes C1 to C4 Incl., L1 to L4 Incl.
T2	100673	Transformer—Pix I.F. link pri. Includes C24, R12
T3	100677	Coil—I.F. coil assembly—Part of S1D
	78467	Board—Terminal board 8 contacts
	78430	Cam—Actuating cam for antenna slide switch
	78417	Cam—VHF fine tuning cam
	77854	Clip—Oscillator trimmer core clip
	77860	Connector—Grounding strap connector
	78237	Connector—Single contact female connector for UHF connections
	72953	Cord—Dial cord
	100670	Core—Oscillator trimmer core
	100669	Detent—R.F. tuner detent mechanism
	100663	Disc—Clutch disc assembly
	77917	Form—Coil form for L17, L40, L54 L17—Part of S1F L40—Part of S1C L54—Part of S1B
	77912	Form—Coil form for L21, L40, L42, L56 L21—Part of S1E L40—Part of S1C L42—Part of S1B L56—Part of S1A
	78581	Form—Coil form for L35, L49 L35—Part of S1C L49—Part of S1B
	100664	Gear—VHF drive gear
	79399	Gear—UHF drive gear
	79406	Gear—UHF drive pulley gear (fast advance)
	77861	Guide—Bakelite guide for fine tuning lever
	100667	Insulator—Antenna slide switch insulator
	78270	Lever—VHF fine tuning lever
	78421	Pin—Clutch mechanism operating pin
	79373	Plate—Detent mounting plate assembly
	79369	Pulley—R.F. tuner drive pulley (3 tooth gear)

SYMBOL No.	STOCK No.	DESCRIPTION
	79407	Pulley—UHF dial drive pulley assembly
	100665	Pulley—UHF fine tuning pulley assembly
	79402	Pulley—UHF clutch pulley 2.5" O.D., 2.375" drive dia.
	79398	Retainer—"E" ring retainer, .600" O.D., .375" shaft dia., .035" thick
	78425	Retainer—Spring type retainer for clutch mechanism
	77849	Retainer—VHF fine tuning lever retainer
	78408	Screw—#6-32 set screw for UHF drive pulley
	100606	Shaft—UHF drive shaft assembly complete
	100668	Shield—Tube shield for V1 & V2
	79366	Socket—Tube socket, 9 pin for V1
	79718	Socket—Tube socket, 9 pin for V2
	78428	Spring—Channel marker escutcheon pulley spring
	78427	Spring—Clutch mechanism operating pin coil spring
	78409	Spring—Dial cord spring
	78241	Spring—Formed spring for stabilizing fine tuning lever
	78422	Spring—Formed spring for actuating clutch disc
	79408	Spring—UHF clutch pulley spring
	77856	Spring—VHF fine tuning lever tension spring
	79403	Stop—UHF gang stop (1 wing)
	79404	Stop—UHF gang stop (2 wings)
	100666	Strap—Stator & rotor mounting strap
	76460	Terminal—Test point terminal
	78426	Washer—"C" washer for clutch mechanism
	79405	Washer—Cork washer, 13/16" O.D., 29/64" I.D., 1/16" thick
	79400	Washer—Flat metal washer .440" I.D., 21/32" O.D.
	78424	Washer—Retaining washer for knob shaft spring
	100674	Washer—Spring washer for antenna slide switch
		(UHF Section)
C301 to C303 Incl.	79553	Capacitor—Variable tuning capacitor
C304, C305	79554	Stator—Oscillator stator assembly
C306	79555	Capacitor—Oscillator trimmer capacitor
C307	79556	Capacitor—Adjustable, ceramic, 0.8-3.5 mmf.
C308	79558	Capacitor—Trimmer, 10-50 mmf.
C309 to C311 Incl.	79559	Capacitor—Feed thru, 1000 mmf.
C312, C313	79560	Capacitor—Fixed, ceramic, 1 mmf., ±0.1 mmf., 500 v. D.C., non-insulated
CR301	77489	Rectifier—UHF diode crystal germanium rectifier
L301, L302		Coil—R.F. tank plate
L303	79557	Tank Assembly—complete with capacitor
L304	79564	Board—Antenna terminal board assembly
L305 to L307 Incl.	79565	Choke—R.F. choke
L308, L309		Coil—Mixer coupling coil for oscillator & output section
L310	79567	Coil—I.F. output coil 0.15 microhenries
L311	79566	Coil—Oscillator loop coil
R301	502222	Resistor—Fixed, composition, 2200 ohms, ±10%, ½ w.
R302	512268	Resistor—Fixed, composition, 6800 ohms, ±10%, 1 w.
R303	502268	Resistor—Fixed, composition, 6800 ohms, ±10%, ½ w.
	79573	Ball—Rotor shaft rear ball bearing (1 req'd)
	79583	Ball—Rotor shaft front ball bearing (7 req'd)
	79561	Board—Crystal mounting board assembly
	100996	Cable—R.F. coaxial cable assembly shielded, 11-9/16" long
	72953	Cord—Dial cord
	79563	Core—Adjustable core for fine tuning capacitor C307
	79575	Cover—Crystal holder & cover
	79574	Fastener—Crystal cover fastener
	79399	Gear—UHF drive gear
	79576	Gear—UHF drive gear assembly
	79406	Gear—UHF drive pulley gear (fast advance)
	79407	Pulley—UHF dial drive pulley assembly (small)
	79402	Pulley—UHF clutch pulley 2.5" O.D. 2.375" drive diameter
	79569	Race—Front ball race
	79398	Retainer—"E" ring retainer .600 O.D., .375 shaft dia., .035 thick
	79568	Screw—#6-20 for bearing race (1 req'd)
	79570	Screw—#10-32 set screw for rear bearing assembly
	79578	Screw—Set screw UHF drive gear set screw (2 req'd)
	79401	Shaft—UHF drive shaft assembly complete with pin
	79580	Shield—Tube shield for V301
	79581	Shield—Tube socket grounding shield
	79579	Socket—Tube socket, 7 pin miniature for V301
	79562	Spacer—Tank oscillator assembly spacer—steatite
	78409	Spring—Dial cord spring
	79571	Spring—R.F. section ground spring—front
	79572	Spring—Rotor section ground springs (4 req'd)
	79408	Spring—UHF clutch pulley spring
	79577	Spring—UHF drive gear spring
	79403	Stop—UHF gang stop (1 wing)
	79404	Stop—UHF gang stop (2 wings)
	79582	Support—Oscillator stator support—steatite
	79405	Washer—Cord washer, 13/16" O.D., 29/64" I.D., 1/16" thick
	79400	Washer—Flat metal washer, .440 I.D., 21/32" O.D.
		CHASSIS ASSEMBLIES CTC4 & CTC4A
C101		Part of T101
C102	100927	Capacitor—Trimmer, 25-280 mmf.
C103	73960	Capacitor—Fixed, ceramic, .01 mf., +100% −0%, 500 v. DC. Part of PC101
C104	39660	Capacitor—Fixed, mica, 2200 mmf., ±5%, 500 v. DC. Part of PC101
C105		Part of T102
C106	74521	Capacitor—Fixed, electrolytic, 5 mf., −10%, +100%, 50 v. DC. Part of PC101
C107	39654	Capacitor—Fixed, mica, 1200 mmf., ±5%, 500 v. DC. Part of PC101
C108	73595	Capacitor—Fixed, paper, .0022 mf., ±10%, 600 v. DC. C108—Part of PC101
C109, C110	73561	Capacitor—Fixed, paper, .01 mf., ±20%, 400 v. DC
C111	100115	Capacitor—Fixed, paper, .018 mf., ±10%, 400 v. DC
C112	39638	Capacitor—Fixed, mica, 270 mmf., ±5%, 500 v. DC
C113	78221	Capacitor—Fixed, paper, .0039 mf., ±10%, 600 v. DC
C114	73599	Capacitor—Fixed, paper, .0027 mf., ±10%, 600 v. DC. Part of PC101
C115	73817	Capacitor—Fixed, paper, .0022 mf., ±20%, 1600 v. DC
C116	100375	Capacitor—Fixed, electrolytic, 90 mf., −10%, +100%, 350 v. DC
C117A, B, C	100393	Capacitor—Fixed, electrolytic, 3 sections: Sec. 1:— 40 mf., −10 +100%, 350 v. DC Sec. 2:— 80 mf., −10 +100%, 200 v. DC Sec. 3:—500 mf., −10 +250%, 25 v. DC
C119	100924	Capacitor—Fixed, ceramic, 27 mmf., ±5%, 500 v. DC
C120	47948	Capacitor—Fixed, ceramic, 39 mmf., ±5%, 500 v. DC
C121		Part of T104
C122, C123	78623	Capacitor—Fixed, ceramic, 1000 mmf., ±20%, 500 v. DC. Part of PC102
C124	79979	Capacitor—Fixed, ceramic, 330 mmf., ±20%, 500 v. DC. Part of PC102
C125, C126		Same as C122
C127		Same as C124
C128, C129		Same as C122
C130		Same as C124
C131	100374	Capacitor—Fixed, ceramic, 5.6 mmf., ±0.5 mmf., 500 v. DC non-insulated. Part of PC102
C132	39664	Capacitor—Fixed, mica, 3300 mmf., ±5%, 500 v. DC
C133	78919	Capacitor—Fixed, electrolytic, 4 mf., +100% −10%, 350 v. DC
C134	205183	Capacitor—Fixed, ceramic, 6.8 mmf., ±0.25 mmf., 500 v. DC
C135, C136		Part of T108
C137	100437	Capacitor—Fixed, mica, 150 mmf., ±10%, 500 v. DC
C138		Same as C104
C139		Same as C103
C140		Same as C133
C141	39652	Capacitor—Fixed, mica, 1000 mmf., ±10%, 500 v. DC
C142 to C144 Incl.	100371	Capacitor—Fixed, paper, .082 mf., ±10%, 1000 v. DC. Part of Video board
C145		Same as C109
C146	100398	Capacitor—Fixed, ceramic, high voltage, 2500 mmf., +50%, −20%, 30,000 volts
C147	100446	Capacitor—Fixed, ceramic, 1000 mmf., 5 K.V.
C148A, B	79786	Capacitor—Fixed, electrolytic, 10/10 mf., +250% −10%, 25 v. DC
C149	73795	Capacitor—Fixed, paper, .0033 mf., ±20%, 600 v. DC

REPLACEMENT PARTS (Continued)

SYMBOL No.	STOCK No.	DESCRIPTION
C150	100439	Capacitor—Fixed, paper, 0.12 mf., ±10%, 400 v. DC
C151	73557	Capacitor—Fixed, paper, 0.1 mf., ±10%, 600 v. DC
C152	73794	Capacitor—Fixed, paper, 0.22 mf., ±10%, 400 v. DC
C153	74957	Capacitor—Fixed, paper, 0.22 mf., ±10%, 600 v. DC
C154, C155	73594	Capacitor—Fixed, paper, .01 mf., ±20%, 600 v. DC
C156	79022	Capacitor—Fixed, mica, 270 mmf., ±20%, 1000 v. DC
C157	33380	Capacitor—Fixed, ceramic, 12 mmf., ±5%, 500 v. DC
C158		Same as C141
C159	73787	Capacitor—Fixed, paper, 0.47 mf., ±20%, 200 v. DC
C160		Same as C109
C161	76474	Capacitor—Fixed, mica, 82 mmf., ±10%, 1000 v. DC
C162	71514	Capacitor—Fixed, ceramic, ±5%, 82 mmf., 500 v. DC
C163	73553	Capacitor—Fixed, paper, .047 mf., ±20%, 400 v. DC
C164	79317	Capacitor—Fixed, paper, .056 mf., ±10%, 600 v. DC
C165	100369	Capacitor—Fixed, paper, .033 mf., ±10%, 400 v. DC. Part of PC102
C166	76994	Capacitor—Fixed, paper, 0.33 mf., ±20%, 200 v. DC
C167	100370	Capacitor—Fixed, paper, .056 mf., ±10%, 600 v. DC. Part of PC102
C168	79316	Capacitor—Fixed, paper, .01 mf., ±10%, 200 v. DC
C169	100376	Capacitor—Fixed, electrolytic, 60 mf., −10% +100%, 300 v. DC
C170 to C172 Incl.		Same as C108
C173	71924	Capacitor—Fixed, ceramic, 56 mmf., ±10%, 500 v. DC
C174	77673	Capacitor—Fixed, ceramic, 470 mmf., ±10%, 1500 v. DC
C175	73790	Capacitor—Fixed, paper, .039 mf., ±10%, 400 v. DC
C176		Same as C103
C177		Same as C149
C178	78977	Capacitor—Fixed, paper, 0.47 mf., ±20%, 400 v. DC
C179	73920	Capacitor—Fixed, paper, .0047 mf., ±10%, 400 v. DC. C179—Part of PC102
C180	73554	Capacitor—Fixed, paper, .027 mf., ±10%, 400 v. DC. Part of PC102
C181	73551	Capacitor—Fixed, paper, 0.1 mf., ±10%, 400 v. DC
C182	73558	Capacitor—Fixed, paper, .047 mf., ±10%, 200 v. DC
C183		Same as C108
C184		Same as C159
C185		Part of PC102; Same as C166
C186	79191	Capacitor—Fixed, mica, 330 mmf., ±5%, 500 v. DC
C187	39640	Capacitor—Fixed, mica, 330 mmf., ±10%, 500 v. DC. Part of PC102
C188		Same as C181—Part of PC102
C189		Same as C179
C190, C191		Same as C109
C192	100438	Capacitor—Fixed, paper, .022 mf., ±20%, 200 v. DC
C193		Same as C122
C194		Part of T112
C195		Same as C103
C196		Same as C108
C197	76992	Capacitor—Fixed, paper, 470 mmf., ±10%, 300 v. DC
C198		Same as C109
C199	78905	Capacitor—Fixed, paper, 0.22 mf., ±20%, 200 v. DC
C200		Same as C103
C201	79992	Capacitor—Fixed, ceramic, 2 mmf., ±0.25 mmf., 500 v. DC
C202	71614	Capacitor—Fixed, ceramic, 120 mmf., ±5%, 500 v. DC
C203		Same as C103
C204		Same as C181
C205		Same as C182
C206		Same as C103
C207		Same as C109
C209	100926	Capacitor—Fixed, ceramic, 4 mmf., ±0.25 mmf., 500 v. DC
C210, C211		Same as C103
C212		Part of T113
C213		Same as C112
C214	79017	Capacitor—Fixed, paper, .0047 mf., ±20%, 400 v. DC
C215		Same as C103; Part of Video board
C216		Same as C202
C217		Same as C103—Part of Video board
C218		Same as C214
C219, C220		Part of T115
C221		Part of T108

SYMBOL No.	STOCK No.	DESCRIPTION
C222		Same as C162
C223, C224	78957	Capacitor—Fixed, electrolytic, 200 mf., −10%, +100%, 250 v. DC
C225A, B	100394	Capacitor—Fixed, electrolytic, dual: Section 1:—80 mf., −10 +50%, 450 v. DC Section 2:—40 mf., −10 +100%, 200 v. DC
C226	79625	Capacitor—Fixed, electrolytic, 1000 mf., −10 +250%, 3 v. DC
C227		Part of Yoke
C228	73818	Capacitor—Fixed, paper, .0027 mf., ±10%, 1600 v. DC
C229	100925	Capacitor—Fixed, ceramic, 2 mmf., ±0.25 mmf., 500 v. DC
C230	73784	Capacitor—Fixed, paper, 0.1 mf., ±20%, 200 v. DC
C231		Same as C108
C232		Same as C197
C233		Same as C122—Part of PC102
C234		Same as C103
C235	100447	Capacitor—Fixed, electrolytic, 5 mf., −10 +250%, 25 v. DC
C236		Same as C103—Part of Video board
C237, C238		Same as C103
C239	78228	Capacitor—Fixed, ceramic, 8 mmf., ±.5 mmf., 500 v. DC. Part of Video board
C240	59483	Capacitor—Fixed, mica, 270 mmf., ±10%, 500 v. DC
C241	39041	Capacitor—Fixed, ceramic, 18 mmf., ±5%, 500 v. DC. Part of Video board
C242, C243	73664	Capacitor—Fixed, ceramic, 39 mmf., ±10%, 500 v. DC
C244		Same as C173
C245	39636	Capacitor—Fixed, mica, 220 mmf., ±10%, 500 v. DC
C246		Same as C229
C247		Same as C241
C248	76995	Capacitor—Fixed, paper, .0012 mf., ±10%, 600 v. DC. Part of Video board
CR101	76675	Rectifier—Picture detector crystal rectifier. Part of PC102
CR102	100449	Crystal—3.58 M.C. crystal
F101	79798	Fuse—.45 amp. fuse
F102, F103	79358	Fuse—Heater fuse assembly with magnetic wire & glass sleeve
F104	79357	Fuse—Glass fuse, 4.5 amps., 250 v.
L101	100421	Coil—I.F. sound coil with adjustable core
L102	100422	Coil—I.F. pix coil with adjustable core
L103, L104		Part of PC102
L105	93486	Coil—Peaking coil, 250 microhenry. Part of PC102
L106	74214	Coil—Peaking coil, 180 microhenry. L106—Part of PC102
L107	100441	Coil—Peaking coil, 12 microhenry
L108	75253	Coil—Peaking coil, 120 microhenry
L110	100442	Coil—Peaking coil, 300 microhenry
L111	93486	Coil—Peaking coil, 62 microhenry. Part of Video board
L112	71526	Coil—Peaking coil, 250 microhenry. Part of Video board
L114	71793	Coil—Peaking coil, 36 microhenry
L115	100415	Choke—Horizontal centering choke
L116	79787A	Coil—Width choke coil, 0.5 microhenry
L117	100414	Coil—Horizontal tuning coil
L118	79161	Coil—Horizontal oscillator coil
L119	79966	Coil—Horizontal frequency and sine wave coil
L120	100413	Choke—Vertical convergence choke
L121 to L123 Incl.	100429	Coil—Phasing
L124		Same as L106
L125	100410	Coil—Hue control coil
L126	74930	Coil—Peaking coil, 12 microhenry. Includes R272
L127	100411	Coil—Reactance tube plate coil
L128	79185	Coil—Peaking coil, 1 millihenry
L129	100448	Coil—Peaking coil, 1.7 millihenry
L130	100597	Coil—Peaking coil, 750 microhenry
L131	100397	Choke—Filter choke
L132 to L135 Incl.		Part of Yoke
L136 to L141 Incl.		On Pole Piece
L142		Same as L107
L143		Same as L129
R101		Part of T101
R102	502112	Resistor—Fixed, composition, 120 ohms, ±10%, ½ w. R102—Part of PC101
R103	502218	Resistor—Fixed, composition, 1800 ohms, ±10%, ½ w. Part of PC101

SYMBOL No.	STOCK No.	DESCRIPTION
R104	502115	Resistor—Fixed, composition, 150 ohms, ±5%, ½ w. Part of PC101
R105	502339	Resistor—Fixed, composition, 39,000 ohms, ±10%, ½ w. Part of PC101
R106	502327	Resistor—Fixed, composition, 27,000 ohms, ±10%, ½ w. R106—Part of PC101
R107A, B	100383	Control—"On-Off" volume and brightness control; Includes S101
R108	502322	Resistor—Fixed, composition, 22,000 ohms, ±10%, ½ w.
R109	502610	Resistor—Fixed, composition, 10 megohm, ±20%, ½ w. Part of PC101
R110A, B	100384	Control—Vertical hold and tone control
R111	502433	Resistor—Fixed, composition, 330,000 ohms, ±10%, ½ w. R111—Part of PC101
R112	502515	Resistor—Fixed, composition, 1.5 megohm, ±5%, ½ w. R112—Part of PC101
R113	502482	Resistor—Fixed, composition, 820,000 ohms, ±10%, ½ w. R113—Part of PC101
R114	522147	Resistor—Fixed, composition, 470 ohms, ±10%, 2 w.
R115	502210	Resistor—Fixed, composition, 1000 ohms, ±10%, ½ w. R115—Part of PC102
R116	502247	Resistor—Fixed, composition, 4700 ohms, ±5%, ½ w. R116—Part of PC102
R117	502068	Resistor—Fixed, composition, 68 ohms, ±5%, ½ w. Part of PC102
R118	522310	Resistor—Fixed, composition, 10,000 ohms, ±10%, 2 w. R118—Part of PC102
R119	502410	Resistor—Fixed, composition, 100,000 ohms, ±5%, ½ w. R119—Part of PC102
R120		Same as R115—Part of PC102
R121		Same as R117—Part of PC102
R122		Same as R119—Part of PC102
R123		Same as R118—Part of PC102
R124	502118	Resistor—Fixed, composition, 180 ohms, ±5%, ½ w. R124—Part of PC102
R125	502147	Resistor—Fixed, composition, 470 ohms, ±10%, ½ w. Part of PC102
R126	502233	Resistor—Fixed, composition, 3300 ohms, ±5%, ½ w. Part of PC102—R126
R127	512212	Resistor—Fixed, composition, 1200 ohms, ±5%, 1 w.
R129	502033	Resistor—Fixed, composition, 33 ohms, ±10%, ½ w.
R131	522322	Resistor—Fixed, composition, 22,000 ohms, ±10%, 2 w.
R132	522312	Resistor—Fixed, composition, 12,000 ohms, ±10%, 2 w.
R133	100443	Resistor—Fixed, w.w., 5000 ohms, ±10%, 10 w.
R134	100381	Control—Contrast control
R135	502318	Resistor—Fixed, composition, 18,000 ohms, ±10%, ½ w.
R136	502110	Resistor—Fixed, composition, 100 ohms, ±10%, ½ w.
R137, R138	522315	Resistor—Fixed, composition, 15,000 ohms, ±5%, 2 w.
R139, R140	512151	Resistor—Fixed, composition, 510 ohms, ±5%, 1 w. Part of Video board
R141 to R143 Incl.	522410	Resistor—Fixed, composition, 100,000 ohms, ±10%, 2 w. Part of Video board—R141 to R143 Incl.
R144 to R146 Incl.	100391	Control—Screen and background controls
R147, R148	100928	Resistor—Fixed, w.w., 3.3 ohms, ±5%, ½ w.
R149	512522	Resistor—Fixed, composition, 2.2 megohms, ±5%, 1 w.
R150	512518	Resistor—Fixed, composition, 1.8 megohms, ±5%, 1 w.
R151	100387	Control—Horizontal drive, high voltage adjustment and AFC balance control
R152	522610	Resistor—Fixed, composition, 10 megohms, ±20%, 2 w.
R153	100396	Control—Focus control
R154	100395	Control—Horizontal centering control
R155	512247	Resistor—Fixed, composition, 4700 ohms, ±5%, 1 w.
R156	79987	Resistor—Fixed, w.w., 11,000 ohms, ±10%, 10 w.
R157	502056	Resistor—Fixed, composition, 56 ohms, ±10%, ½ w.
R158	512339	Resistor—Fixed, composition, 39,000 ohms, ±10%, 1 w.
R159		Same as R102
R160	502447	Resistor—Fixed, composition, 470,000 ohms, ±10%, ½ w.
R161	502415	Resistor—Fixed, composition, 150,000 ohms, ±10%, ½ w.
R162		Same as R151
R163		Same as R161
R164	502368	Resistor—Fixed, composition, 68,000 ohms, ±10%, ½ w.
R165	502239	Resistor—Fixed, composition, 3900 ohms, ±10%, ½ w.
R166		Same as R111
R167	512382	Resistor—Fixed, composition, 82,000 ohms, ±10%, 1 w.
R168	512410	Resistor—Fixed, composition, 100,000 ohms, ±5%, 1 w.
R169		Same as R113
R170	512415	Resistor—Fixed, composition, 150,000 ohms, ±5%, 1 w.
R171	502533	Resistor—Fixed, composition, 3.3 megohms, ±10%, ½ w.
R172	522339	Resistor—Fixed, composition, 39,000 ohms, ±10%, 2 w.
R173	502315	Resistor—Fixed, composition, 15,000 ohms, ±5%, ½ w.
R174	502522	Resistor—Fixed, composition, 2.2 megohm, ±5%, ½ w.
R176A, B	100390	Control—Vertical, height and linearity control
R177A, B to R179A, B Incl.	100388	Control—Vertical amplitude and tilt controls
R180, R181	100392	Control—Horizontal amplitude controls
R182		Same as R108
R183		Same as R106
R184	502347	Resistor—Fixed, composition, 47,000 ohms, ±10%, ½ w.
R185	502133	Resistor—Fixed, composition, 330 ohms, ±10%, ½ w.
R186A, B	100389	Control—AGC noise invertor control
R187	502333	Resistor—Fixed, composition, 33,000 ohms, ±5%, ½ w.
R188	502427	Resistor—Fixed, composition, 270,000 ohms, ±10%, ½ w.
R189	502310	Resistor—Fixed, composition, 10,000 ohms, ±10%, ½ w.
R190		Same as R160.
R191		Same as R174—Part of PC102
R192		Same as R160
R193	522527	Resistor—Fixed, composition, 2.7 megohms, ±10%, 2 w.
R194	502510	Resistor—Fixed, composition, 1.0 megohm, ±5%, ½ w.
R196		Same as R135
R197		Same as R141
R198		Same as R135
R199		Same as R161
R200		Same as R187
R201	502412	Resistor—Fixed, composition, 120,000 ohms, ±5%, ½ w.
R202		Same as R194.
R203		Same as R171
R204		Same as R188
R205 to R207 Incl.		Same as R112—Part of PC102
R208		Same as R194—Part of PC102
R209	502356	Resistor—Fixed, composition, 56,000 ohms, ±5%, ½ w. R209—Part of PC102
R210		Same as R106—Part of PC102
R211	512282	Resistor—Fixed, composition, 8200 ohms, ±5%, 1 w. Part of PC102
R212	502256	Resistor—Fixed, composition, 5600 ohms, ±10%, ½ w. R212—Part of PC102
R213	502227	Resistor—Fixed, composition, 2700 ohms, ±10%, ½ w. Part of PC102
R214	512127	Resistor—Fixed, composition, 270 ohms, ±10%, 1 w.
R215		Same as R116
R216	100382	Control—Color control
R217	502456	Resistor—Fixed, composition, 560,000 ohms, ±5%, ½ w.
R218		Same as R174
R219	512418	Resistor—Fixed, composition, 180,000 ohms, ±10%, 1 w.
R220		Same as R174
R221	502156	Resistor—Fixed, composition, 560 ohms, ±10%, ½ w.
R222		Same as R102
R223	502618	Resistor—Fixed, composition, 18 megohms, ±5%, ½ w.
R224		Same as R174.
R226		Same as R115
R227		Same as R194
R228		Same as R151
R229		Same as R194
R231		Same as R118
R232	502222	Resistor—Fixed, composition, 2200 ohms, ±10%, ½ w.

SYMBOL No.	STOCK No.	DESCRIPTION
R233	522239	Resistor—Fixed, composition, 3900 ohms, ±10%, 2 w.
R234	502439	Resistor—Fixed, composition, 390,000 ohms, ± 5%, ½ w. Part of Video board
R235		Same as R106
R236	502122	Resistor—Fixed, composition, 220 ohms, ±10%, ½ w.
R237		Same as R118
R238	512233	Resistor—Fixed, composition, 3300 ohms, ±10%, 1 w.
R239	512215	Resistor—Fixed, composition, 1500 ohms, ±10%, 1 w.
R240	512156	Resistor—Fixed, composition, 560 ohms, ±10%, 1 w.
R241		Same as R173
R242	502182	Resistor—Fixed, composition, 820 ohms, ±10%, ½ w.
R243		Same as R125
R244	512327	Resistor—Fixed, composition, 27,000 ohms, ±10%, 1 w.
R245	522347	Resistor—Fixed, composition, 47,000 ohms, ±10%, 2 w.
R246		Same as R232
R247		Same as R189
R248		Same as R184
R249	512347	Resistor—Fixed, composition, 47,000 ohms, ±10%, 1 w.
R250		Same as R115
R251	502468	Resistor—Fixed, composition, 680,000 ohms, ±5%, ½ w.
R252	522356	Resistor—Fixed, composition, 56,000 ohms, ±10%, 2 w.
R254		Same as R232
R255	502422	Resistor—Fixed, composition, 220,000 ohms, ±10%, ½ w. Part of Video board
R256		Same as R201
R257, R258	502418	Resistor—Fixed, composition, 180,000 ohms, ±10%, ½ w. Part of Video board
R259		Same as R252
R260		Same as R232
R261		Same as R257; Part of Video board
R262		Same as R161; Part of Video board
R263		Same as R144
R264, R265		Same as R209
R266	100304	Resistor—Fixed, w.w., 500 ohms, ±10%, 20 w.
R267	100386	Control—Vertical centering control
R268, R269	522110	Resistor—Fixed, composition, 100 ohms, ±10%, 2 w.
R270, R271		Part of Yoke
R272		Part of L126
R273		Same as R185
R274	502382	Resistor—Fixed, composition, 82,000 ohms, ±10%, ½ w.
R275	100444	Resistor—Fixed, w.w., 2500 ohms, ±10%, 7 w.
R276	522447	Resistor—Fixed, composition, 470,000 ohms, ±10%, 2 w.
R277, R278		Same as R152
R279		Same as R119
R280	522215	Resistor—Fixed, composition, 1500 ohms, ±5%, 2 w. Part of Video board
R281		Same as R252
R282		Same as R126—Part of Video board
R283		Same as R209
R284		Same as R144
R285		Same as R180
R286		Same as R126—Part of Video board
R287	502539	Resistor—Fixed, composition, 3.9 megohms, ±10%, ½ w.
R288	512047	Resistor—Fixed, composition, 47 ohms, ±10%, 1 w.
R289 to R291 Incl.		Part of H.V. connector
R292, R293		Same as R252
R294		Same as R137
R295, R296	522382	Resistor—Fixed, composition, 82,000 ohms, ±5%, 2 w.
R297	522227	Resistor—Fixed, composition, 2700 ohms, ±5%, 2 w.
R298		Same as R165
R299	502282	Resistor—Fixed, composition, 8200 ohms, ±10%, ½ w.
R300		Same as R126
R301	512310	Resistor—Fixed, composition, 10,000 ohms, ±10%, 1 w.
R302		Same as R212
R303		Same as R280—Part of Video board
R304		Same as R126—Part of Video board
R305		Same as R232
R306		Same as R276
R307	522333	Resistor—Fixed, composition, 33,000 ohms, ±10%, 2 w.
R308	78808	Control—Killer threshold control
R309		Same as R221
R310		Same as R116
R311	512333	Resistor—Fixed, composition, 33,000 ohms, ±10%, 1 w.
R312		Same as R114
R313		Same as R157
R314	512147	Resistor—Fixed, composition, 470 ohms, ±5%, 1 w. Part of Video board
R315		Same as R124
R316	512710	Resistor—Fixed, composition, 100 megohms, ±5%, 1 w.
S101		Part of R107
S103	100404	Switch—Rotary switch for width control
SR101,SR102	100412	Rectifier—High voltage selenium rectifier
T101	100425	Transformer—I.F. sound take off transformer
T102	100420	Transformer—Ratio detector transformer
T103	100037	Transformer—Audio output transformer for Model 21-CT-661U
T103	77821	Transformer—Audio output transformer for Model 21-CT-662U
T104	100418	Transformer—I.F. link pix sec.
T105, T106	100417	Transformer—1st and 2nd picture I.F. transformer
T107	100419	Transformer—3rd picture I.F. transformer
T108	100426	Transformer—Color take off transformer. Includes C221
T109	100409	Transformer—High voltage transformer
T110	100428	Transformer—Vertical output transformer
T111	79379	Transformer—Vertical blocking oscillator transformer
T112	100431	Transformer—Phase detector transformer. Includes C194
T113	100424	Transformer—Band pass transformer. Includes C212
T114	100427	Transformer—Demodulator driver transformer
T115	100430	Transformer—3.58 M.C. C.W. transformer. Includes C219, C220
T116	78900	Choke—Vertical centering choke
T117	100432	Transformer—Power transformer
TD101	100451	Line—Delay line
	100434	Board—Antenna terminal board assembly
	100406	Bracket—Contrast control mounting bracket
	79151	Bracket—Tube socket mounting bracket
	74594	Connector—A.C. interlock connector
	100368	Connector—Convergence base connector
	100400	Connector—High voltage interlock connector and lead 18" long polyethylene
	100403	Connector—High voltage connector and lead complete with nylon cap
	79001	Coupling—Contrast control shaft coupling
	78068	Eyelet—Speaker cable eyelet
	73155	Grommet—High voltage shield assembly insulating grommet (rubber)
	100408	Holder—Convergence base holder
	79641	Holder—High voltage fuse holder assembly
	100399	Insulator—High voltage insulator 4⅜" x 4 1/16" bakelite
	100407	Knob—High voltage insulator knob—nylon—with screw driver slot
	79533	Knob—Horizontal frequency and sine wave coil knob
	100450	Lead—Tube cap and lead for focus rectifier
	18469	Plate—Bakelite insulating plate for electrolytic mounting
	100372	Retainer—Sine wave and horizontal frequency control knob retainer
	78408	Screw—#6-32 x ¼" set screw
	74601	Screw—#8-32 x ⅜" long pan head for high voltage capacitor insulator mounting
	100405	Shaft—Contrast control shaft (laminated) 17 15/32" long
	76972	Shield—Tube shield for V101, V102, V107, V107A, V108, V108A, V109, V109A, V110, V111, V125
	73521	Shield—Tube shield for V120
	75718	Socket—Channel indicator socket and lead assembly
	100452	Socket—Kinescope socket and lead assembly
	100377	Socket—Tube socket, 7 pin, miniature for V103
	71494	Socket—Tube socket, 7 pin, miniature for V118
	73117	Socket—Tube socket, 7 pin, miniature for V120
	68590	Socket—Tube socket, octal for V112
	31251	Socket—Tube socket, octal for V113, V116, V117, V123
	79655	Socket—Tube socket, octal for V115

REPLACEMENT PARTS (Continued)

SYMBOL No.	STOCK No.	DESCRIPTION
	100378	Socket—Tube socket, 9 pin, miniature for V101, V107A
	76971	Socket—Tube socket, 9 pin, miniature for V107, V108, V109, V110, V111, V125
	100379	Socket—Tube socket, 9 pin, miniature for V102, V108A
	100380	Socket—Tube socket, 9 pin, miniature for V109A
	100373	Socket—Tube socket, 9 pin for V114
	35969	Washer—"C" type contrast control shaft retaining washer
		SPEAKER ASSEMBLY 971490-4
	77872	Speaker—8" P.M. speaker complete with cone and voice coil (3.2 ohms) (21-CT-661U—1 req'd) (21-CT-662U—2 req'd)
		MISCELLANEOUS
	100715	Back—Cabinet back assembly
	100707	Bracket—Hidden control cover and case assembly mounting bracket
	100709	Case—Cover and case assembly for hidden controls for mahogany instruments.
	100710	Case—Cover and case assembly—for hidden controls for blonde tropical hardwood instruments
	79597	Clamp—Safety glass side retainer clamp (6 req'd)
	79598	Clamp—Safety glass top and bottom retainer clamp (4 req'd)
	100978	Clip—Pole-piece coil and magnet retaining spring clip
	X3460	Cloth—Cabinet grille cloth
	100701	Connector—Kinescope shield connector male
	100979	Connector—Pole-piece coil male connector with cover
	79411	Cushion—Safety glass corner insert and clamp cushion (10 req'd)
	79612	Cushion—Safety glass rubber cushion (long) for top and bottom (2 req'd)
	79617	Cushion—Safety glass rubber cushion (short) for sides (2 req'd)
	78631	Decal—Control marker decal for mahogany instruments
	78632	Decal—Control marker decal for blonde tropical hardwood instruments
	77783	Emblem—"Deluxe" emblem
	79506	Escutcheon—Channel marker escutcheon
	100706	Fastener—Tie rod fastener
	79591	Glass—Safety glass
	100713	Holder—Deflection yoke holder
	100973	Holder—Pole-piece coil and magnet assembly holder (nylon)
	79431	Insert—Safety glass side retainer insert (2 req'd)
	79421	Insert—Safety glass corner insert assembly (R.H.) (2 req'd)
	79420	Insert—Safety glass corner insert assembly (L.H.) (2 req'd)
	79470	Knob—Brightness control knob—brown maroon—for mahogany instruments
	79444	Knob—Brightness control knob—deep umber gray—for blonde tropical hardwood instruments
	79508	Knob—Channel selector knob—maroon—for mahogany instruments
	79509	Knob—Channel selector knob—sandtone—for blonde tropical hardwood instruments
	79465	Knob—Fine tuning control knob
	79471	Knob—"On-Off" volume control knob—brown maroon—for mahogany instruments
	79445	Knob—"On-Off" volume control knob—sandtone—for blonde tropical hardwood instruments
	75945	Knob—Tone and contrast control knob—maroon
	100929	Magnet—Color equalizer magnet and knob assembly
	11891	Lamp—Mazda 44 pilot lamp
	100975	Magnet—Magnet and knob assembly (convergence—3 req'd)
	100974	Magnet—Pole-piece magnet (ferrite—6 req'd)
	79604	Magnet—Purity magnet ring assembly
	79669	Magnet—Blue lateral magnet assembly
	100699	Marker—Gilt nail channel marker
	79587	Mask—Kinescope mask—polystyrene 22" x 24¾"
	100982	Nameplate—"RCA Victor" nameplate for blonde tropical hardwood instruments
	77033	Nameplate—"RCA Victor" nameplate for mahogany instruments
	76177	Nut—Knurled nut for kine tie rods (3 req'd)
	73634	Nut—"RCA Victor" nameplate and ornament nuts
	100983	Ornament—Brass ornament "V" shaped
	74337	Retainer—"Deluxe" emblem retainer
	100977	Retainer—Pole-piece magnet and knob assembly retainer
	79595	Retainer—Safety glass side channel retainer (2 req'd)
	79614	Retainer—Safety glass top and bottom channel retainer (2 req'd)
	100716	Ring—Kinescope mounting ring assembly
	100704	Rod—Kinescope mounting tie rod (short)
	100703	Rod—Kinescope mounting tie rod (long) (2 req'd)
	100702	Shield—Kinescope shield liner polyethylene 21¼" dia.
	100700	Shield—Kinescope shield (boot) polyethylene 22" dia., 14⅝" long
	79667	Shield—Safety glass top and bottom and side retainer clamp shield (10 req'd)
	78347	Spring—Channel marker escutcheon retainer spring
	100976	Spring—Pole-piece coil and magnet retaining spring (3 req'd)
	79599	Spring—Safety glass insert retaining spring (8 req'd)
	100984	Trim—Brass cabinet trim
	100711	Yoke—Deflection yoke assembly complete with 8 contact male connector