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RCA VICTOR

CLOCK TELEVISION RECEIVERS

MODELS

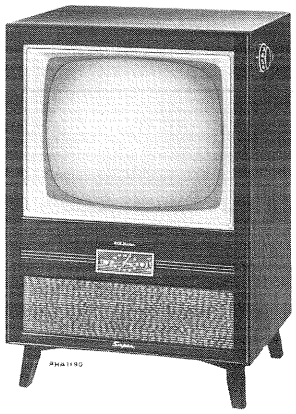
21-T-639, 21-T-639U

Chassis No. - KCS101 or KCS101A

— Mfr. No. 274 —

SERVICE DATA

— 1956 No. T1 —



Models 21-T-639, 21-T-639U
"Teletimer 21"
Mahogany, Oak

RCA LABORATORIES DIVISION
LIBRARY
3/22/57
PRprinceton, N. J.

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

GENERAL DESCRIPTION

Models 21-T-639 and 21-T-639U are console clock television receivers. Model 21-T-639 features full 12 channel VHF coverage. Model 21-T-639U features full 12 channel VHF coverage plus any UHF channels desired.

The clock timer provides for either manual or automatic control of the receiver. Automatic turn on at a predetermined time up to 11¾ hours in advance may be accomplished, with automatic turn off after any period of operation up to six hours.

Both models include intercarrier FM sound system, ratio detector, improved picture brilliance, AFC horizontal hold, stabilized vertical hold, and reduced hazard high voltage supply.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

PICTURE SIZE..Approx. 263 sq. ins. on a 21AMP4A Kinescope

TELEVISION R-F FREQUENCY RANGE

Model 21-T-639

All 12 television channels, 54 mc. to 88 mc., 174 mc. to 216 mc.

Model 21-T-639U

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.
POWER RATING.....215 watts
AUDIO POWER OUTPUT RATING.....2.5 watts max.
VIDEO RESPONSE.....To 3.2 mc.
SWEEP DEFLECTION.....Magnetic
FOCUS.....Magnetic

ANTENNA INPUT IMPEDANCE

Model 21-T-639

300 ohms balanced.

Model 21-T-639U

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

RCA TUBE COMPLEMENT

Tube Used	Function
Tuner KRK38B (21-T-639)	
(1) RCA 6BQ7A	R-F Amplifier
(2) RCA 6X8	R-F Oscillator and Mixer

RCA TUBE COMPLEMENT

Tube Used	Function
Tuner KRK38C (21-T-639U)	
(1) RCA 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

A K3D or a 1N82 crystal is used as the UHF mixer.

All Models

(1) RCA 6DE6	1st Picture I-F Amplifier
(2) RCA 6DE6	2nd Picture I-F Amplifier
(3) RCA 6AS8	3rd Picture I-F Amp. & 2nd Det.
(4) RCA 6AW8	1st Video Amp. & Noise Cancel.
(5) RCA 6AQ5	Video Output
(6) RCA 6U8	Sound I-F Amp. & 1st Audio Amp.
(7) RCA 6AL5	Ratio Detector
(8) RCA 6AQ5	Audio Output
(9) RCA 6U8	1st Sync. & AGC
(10) RCA 6CG7	Vert. Osc. & Sync. Output
(11) RCA 6AQ5	Vertical Output
(12) RCA 6CG7	Horizontal Sweep Oscillator and Control
(13) RCA 6BQ6GTB	Horizontal Sweep Output
(14) RCA 6AX4GT	Damper
(15) RCA 1B3-GT	High Voltage Rectifier
(16) RCA 21AMP4A	Kinescope
(17) RCA 5U4GB or 5AS4	Rectifier

SECOND EDITION—FIRST PRINTING—2-25-57—SUPERSEDES ALL 1ST EDITION PRINTINGS

Tmks. ® Reg. U. S. Pat. Off.

Printed in U.S.A.

ELECTRICAL AND MECHANICAL SPECIFICATIONS
(Continued)

CHASSIS DESIGNATIONS

CHASSIS	TUNER ASSEMBLY	TUNER Sub-assemblies	MODELS
KCS101	KRK38B	KRK22H	21-T-639
KCS101A	KRK38C	KRK29N KRK36	21-T-639U

OPERATING CONTROLS (Right side)

All Receivers

VHF Channel Selector, VHF Fine Tuning ..... Dual Control Knobs

Sound Volume and On-Off Switch, Picture ..... Dual Control Knobs

UHF/VHF Models only

UHF Tuning ..... Single Control Knob

OPERATING CONTROLS (Front)

Brightness ..... Single Control under Panel
Horizontal Hold ..... Single Control under Panel
Start Time ..... Single Control on Clock
Time Set ..... Single Control on Clock
Tone ..... Single Control under Panel
Vertical Hold ..... Single Control under Panel
View Time (Auto-Manual On-Off Switch) ..... Single Control on Clock

NON-OPERATING CONTROLS

AGC ..... rear chassis adjustment
Deflection Coil ..... top chassis adjustment
Height ..... rear chassis adjustment
Horizontal Drive ..... rear chassis adjustment
Horizontal Oscillator Waveform ..... top chassis adjustment
Ion Trap Magnet ..... top chassis adjustment
Noise Limiter ..... rear chassis adjustment
Picture Centering ..... top chassis adjustment
Vertical Linearity ..... rear chassis adjustment
Width ..... rear chassis adjustment

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 SHIELD REMOVED. MAKE SURE THAT THE GROUND STRAP BETWEEN THE CHASSIS SHIELD PLATE AND THE FRONT TRIM AND THE STRAP BETWEEN THE FRONT TRIM AND THE TUNER BRACKET ARE SECURELY FASTENED AND MAKING CONTACT BEFORE TURNING THE RECEIVER ON.

KINESCOPE HANDLING PRECAUTIONS

DO NOT 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 these reasons, kinescopes 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. In installation, 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.

OPERATING INSTRUCTIONS

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

MANUAL OPERATION (VHF)

1. Turn the VIEW TIME control, on the clock timer, clockwise toward MANUAL ON until the work ON appears in the dial window.
2. Set the VHF CHANNEL SELECTOR to the desired channel.
3. Adjust the VOLUME control for suitable volume.
4. Turn the BRIGHTNESS control fully counter-clockwise, then clockwise until a pattern appears on the screen.
5. Adjust the VERTICAL hold control until the pattern stops vertical movement.
6. Adjust the HORIZONTAL hold control until a picture is obtained and centered.
7. Adjust the FINE TUNING, PICTURE and BRIGHTNESS control for suitable picture contrast and brightness.
8. In switching from one channel to another, it may be necessary to repeat steps 3 and 7.
9. When the set is turned on again after an idle period it should not be necessary to repeat the adjustment if the positions of the controls have not been changed. If any adjustment is necessary, step No. 7 is generally sufficient.
10. If the positions of the controls have been changed, it may be necessary to repeat steps 1 through 7.

MANUAL OPERATION (UHF)—Model 21-T-639U only

1. Turn the VHF CHANNEL SELECTOR switch to the UHF position.
2. Turn the VIEW TIME control, on the clock timer, clockwise toward MANUAL ON until the word ON appears in the dial window.
3. Tune in the desired UHF channel by turning the UHF TUNING control to the channel selected and adjust VOLUME to the desired level.
4. Repeat steps 4 through 10 as outlined under VHF operation.

AUTOMATIC OPERATION (VHF or UHF)

The clock will start immediately upon insertion of the power cord in the AC receptacle. Set the clock to the proper hour of the day by turning the TIME SET control in the center of the clock face clockwise to the correct time.

Automatic control of the receiver is accomplished as follows:

1. Adjust the receiver, if necessary, as described under MANUAL OPERATION.
2. Turn the START TIME control counter-clockwise to the predetermined time at which it is desired to have the receiver come on. (Up to 11¾ hours later.)
3. Turn the VIEW TIME control counter-clockwise toward AUTO-ON and set for the desired length of viewing time, as indicated on the dial.

The above settings will turn the receiver on at the desired time automatically. The receiver will operate for the period of time indicated and will then turn off automatically.

NOTE:—The period of operation of the receiver when turned on MANUALLY may also be controlled. To do this, turn the TIME SET knob clockwise to ON. Continue clockwise rotation and set the desired period of operation on the TIME SET dial. The receiver will operate for the time indicated and then shut off automatically.

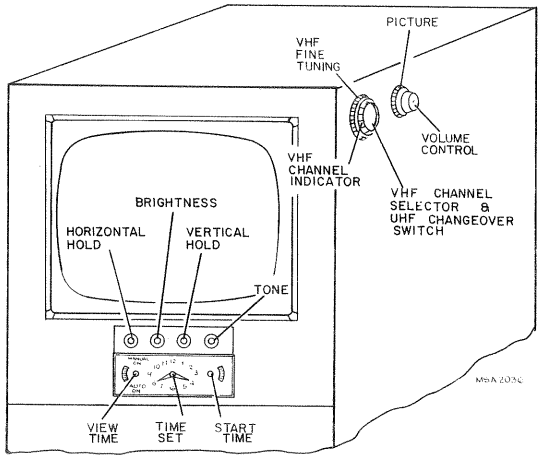


Figure 1—Operating Controls — Model 21-T-639

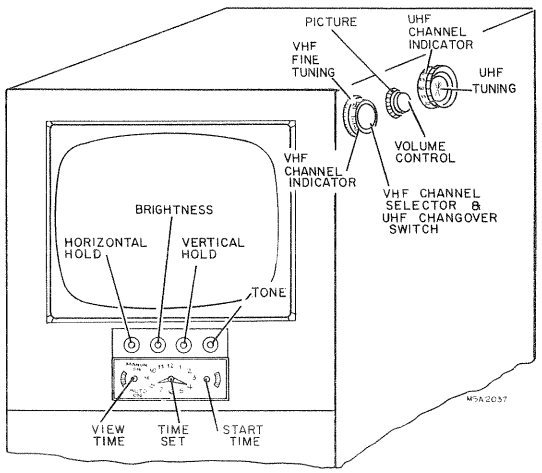


Figure 2—Operating Controls — Model 21-T-639U

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.

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

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

Plug a power cord into the 115 volt a-c power source and into the receiver interlock receptacle.

Connect the antenna or antennas to be used, to the terminals at the rear of the receiver. The cabinet antenna may be employed where local conditions indicate satisfactory reception can be obtained.

ANTENNA INPUT

Model 21-T-639

The KRK38B tuner unit is designed for VHF reception only, with a 300 ohm antenna input provided.

Model 21-T-639U

The KRK38C tuner unit is designed for UHF-VHF reception with 300 ohm inputs provided for UHF and VHF use. When using a UHF antenna only or a VHF antenna only connect the single transmission line to the proper receiver antenna terminals. Do not connect the terminal board jumper W52. (Refer to figure 66.)

When a combination UHF-VHF antenna is used, connect the transmission line to the VHF terminals on the terminal board. Connect the jumper W52 to the UHF terminals as shown in figure 66.

Signals from separate UHF and VHF antennas may be fed to the tuner. To do this connect the individual transmission lines to their respective terminals on the terminal board. Do not connect the jumper W52. Where a "crossover network" is employed to match the two separate antennas to a common 300 ohm line, connect the line to the VHF terminals. Connect the jumper W52 to the UHF terminals on the terminal board.

CHECK FOR PROPER OPERATION.—Turn the power switch to the "on" position and check the operation of the

receiver.

Each unit has been completely and accurately adjusted at the factory and should operate normally at this point. However, a check of all the various functions should be performed. Adjustment should be made as outlined below, only where an indication of improper operation is evident.

ION TRAP MAGNET ADJUSTMENT.—Set the ion trap magnet approximately in the position shown in Figure 3. Starting from this position immediately adjust the magnet by moving it forward or backward at the same time rotating it slightly around the neck of the kinescope for the brightest raster on the screen. Reduce the brightness control setting until the raster is slightly above average brilliance. Turn the focus control (shown in Figure 3) until the line structure of the raster is clearly visible. Readjust the ion trap magnet for maximum raster brilliance. The final touches of this adjustment should be made with the brightness control at the maximum clockwise position with which good line focus can be maintained.

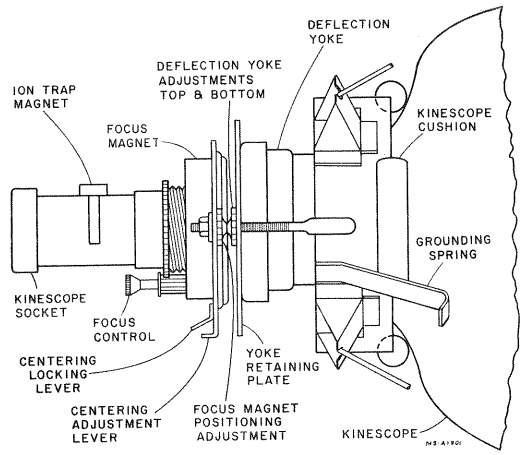


Figure 3—Yoke and Focus Magnet Adjustments

DEFLECTION YOKE ADJUSTMENT.—If the lines of the raster are not horizontal or squared with the picture mask, rotate the deflection yoke until this condition is obtained. Tighten the knurled yoke adjustment nuts.

PICTURE ADJUSTMENTS.—It will now be necessary to obtain a test pattern or picture in order to make further adjustments.

When 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, turn R198 on the rear apron (see Figure 4) counter-clockwise until the set operates normally and the picture can be synced.

CHECK OF HORIZONTAL OSCILLATOR ADJUSTMENT.—Turn the horizontal hold control in the extreme clockwise position. The picture should be out of sync, with approximately twelve bars slanting downward to the left. Turn the control counter-clockwise slowly. The number of diagonal black bars will be gradually reduced and when only 1½ to 3 bars sloping downward to the left are obtained, the picture will pull into sync upon slight additional counter-clockwise rotation of the control. The picture should remain in sync for approximately two full turns of additional counter-clockwise rotation of the control. Continue counter-clockwise rotation until the picture falls out of sync. Rotation beyond fall out position should produce between 2 and 5 bars before interrupted oscillation "motorboat" occurs. Interrupted oscillation "motorboat" should be reached before full counter-clockwise rotation.

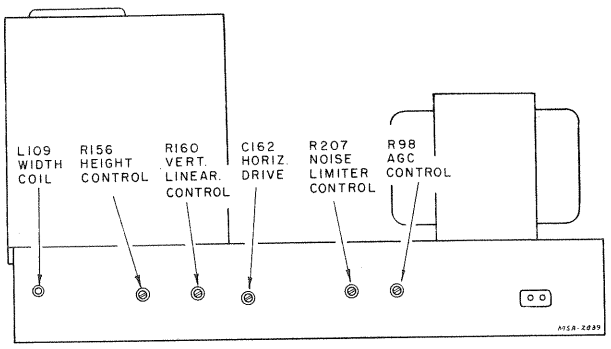


Figure 4—Rear Chassis Adjustments

When the receiver passes the above checks and the picture is normal and stable, the horizontal oscillator is properly aligned. Skip "Adjustment of Horizontal Oscillator" and proceed with "Focus Magnet Adjustment."

ADJUSTMENT OF HORIZONTAL OSCILLATOR.—If in the above check the receiver failed to hold sync over two full turns of counter-clockwise rotation of the control from the pull-in point, it will be necessary to make the following adjustments.

The width and drive adjustments should be properly set, as explained in the paragraph below, before adjusting the sine wave coil.

Set the sine wave coil L108 fully counter-clockwise.

Adjustment of the horizontal hold control in the counter-clockwise direction will show a multiple number of bars before "motorboat" occurs. Adjust the sine wave coil L108 until 3 or 4 bars are present before "motorboat" occurs, when the horizontal frequency control is rotated counter-clockwise from the fall out point.

If it is impossible to sync the picture and the AGC system is in proper adjustment it will be necessary to align the Horizontal Oscillator by the method outlined in the alignment procedure on page 15.

FOCUS MAGNET ADJUSTMENT.—The focus magnet should be positioned so that there is approximately three-eighths inch of space between the rear retaining plate of the yoke and the flat of the front face of the focus magnet. This spacing gives best average focus over the face of the tube. After tightening the yoke plate, run the knurled focus magnet nuts flush against the nuts holding the yoke plate.

The axis of the hole through the magnet should be parallel with the axis of the kinescope neck with the kinescope neck centered in the opening.

CENTERING ADJUSTMENT.—Centering is accomplished by means of a separate plate on the focus magnet. The centering plate includes a locking lever which must be loosened before centering. Up and down adjustment of the plate moves the picture from side to side and sidewise adjustment moves the picture up and down.

If a corner of the raster is shadowed, check the position of the ion trap magnet. Reposition the magnet within the range of maximum raster brightness to eliminate the shadow and recenter the picture by adjustment of the focus magnet plate. In no case should the magnet be adjusted to cause any loss of brightness since such operation may cause immediate or eventual damage to the tube. In some cases it may be necessary to shift the position of the focus magnet in order to eliminate a corner shadow.

WIDTH AND DRIVE ADJUSTMENTS.—Set the horizontal control at the "pull-in" point. Adjustment of the horizontal drive control affects the high voltage applied to the kinescope. In order to obtain the highest possible voltage hence the brightest and best focused picture, set the width coil maximum counter-clockwise and adjust horizontal drive trimmer counter-clockwise until a bright vertical line appears in the middle of the picture, then clockwise until the bright line just disappears. If no line appears set the drive trimmer at maximum counter-clockwise position.

At normal brightness adjust the width coil L109 to obtain ¾" overscan at each side with normal line voltage.

Readjust the drive trimmer C162 as was done previously.

HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS.—Adjust the height control (R156 on chassis rear apron) until the picture overscans approximately ⅝" at both top and bottom. Adjust vertical linearity (R160 on chassis rear apron) until the test pattern is symmetrical from top to bottom. Adjustment of either control will require a readjustment of the other. Adjust centering to align the picture with the mask.

INSTALLATION INSTRUCTIONS

FOCUS.—Adjust the focus control for maximum definition in the test pattern vertical "wedge" and best focus in the white areas of the pattern.

Recheck the position of the ion trap magnet to make sure that maximum bright ness is obtained.

Check to see that the knurled nuts of the yoke and focus magnet and the focus magnet mounting nuts are tight.

KRK38B, or KRK38C VHF R-F OSCILLATOR ADJUSTMENTS.—Tune in all available stations to assure 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 11 or page 14. To perform oscillator adjustments the tuner bracket must be unmounted from the cabinet. To do this, remove all the knobs on the side of the cabinet. Take off the nuts holding the tuner bracket and drop the bracket down to a position where adjustment can be made.

Adjustments for channels 2 through 12 are available through the holes on the front of the tuner and progress clockwise from 2 to 12 starting at the large blank space at the upper right. Adjustment for channel 13 is on top of the tuner chassis. The oscillator for the UHF tuner section of the KRK38C tuner should be adjusted only by the method outlined on page 14 under Alignment Procedure.

AGC AND NOISE LIMITER CONTROLS.—The AGC and Noise Limiter controls should be checked for proper adjustment at the time of installation of the receiver.

To check the adjustment of these controls, tune in a strong signal and sync the picture. Momentarily remove the signal by switching off channel and then back. If the picture reappears immediately, the receiver is not overloading due to improper adjustment. If the picture bends at all, readjustment should be made.

Turn the Noise Limiter control R207 fully clockwise.

Adjust the AGC control slowly clockwise for a slight bend in the picture, then turn the control counter-clockwise approximately ¼ turn (90°) from this point.

Adjust the fine tuning control until the 4.5 mc. beat is just perceptible in the picture. Readjust the AGC control for start of picture bend, then counter-clockwise 45° from this point.

Set the horizontal hold control as far counter-clockwise as possible without sync becoming unstable.

Turn the Noise Limiter control counter-clockwise until a horizontal bend or shift in position is visible in the picture, then clockwise about 30° past the point where the bend just disappears.

Return the horizontal hold control to the center of its holding range.

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. The trap is L53 on KRK38B or L5 on KRK38C tuners and is located on the rear of the antenna matching transformer.

CAUTION.—In some receivers, the FM trap L5 or L53 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 L5 or L53 to make sure that it does not affect sensitivity on these two channels.

Replace the cabinet back and connect the receiver antenna leads to the antenna terminals. Make sure that the screws holding the cabinet back are up tight, otherwise it may rattle or buzz when the receiver is operated at high volume.

CABINET ANTENNA.—A cabinet antenna is provided in both models and leads are brought out near the antenna terminal board. The cabinet antenna may be employed for both UHF and VHF reception in place of the outdoor antenna in areas where the signals are strong and no reflections are experienced.

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

To do this, remove the rear panel of the receiver. There are eight flat springs holding the front metal trim of the cabinet to the kinescope mask.

Reach in from the rear 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 by another person 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 be cleaned only with a soft cloth and "Windex" or similar cleaning agent.

Replace the safety glass, the metal trim, and the cabinet rear panel.

CHASSIS REMOVAL.—To remove the chassis from the cabinet for repair or installation of a new kinescope, remove the control knobs, the cabinet back, unplug the speaker cable, the clock cable, the kinescope socket, the antenna cable, the yoke and high voltage cable. Take out the chassis bolts under the cabinet. Remove the units holding the tuner bracket assembly to the side of the cabinet. Withdraw both the chassis and tuner assembly from the rear of the cabinet.

The tuner assembly should be fastened to the chassis, if the chassis is to be transported out of the cabinet. To do this, turn the tuner bracket upside down from its normal position. With the front of the VHF Tuner toward the chassis front, fasten the bracket to the right side of the chassis, with self-tapping screws, through the two top mounting holes. Holes are provided in the chassis for this purpose. (Refer to figure 5.)

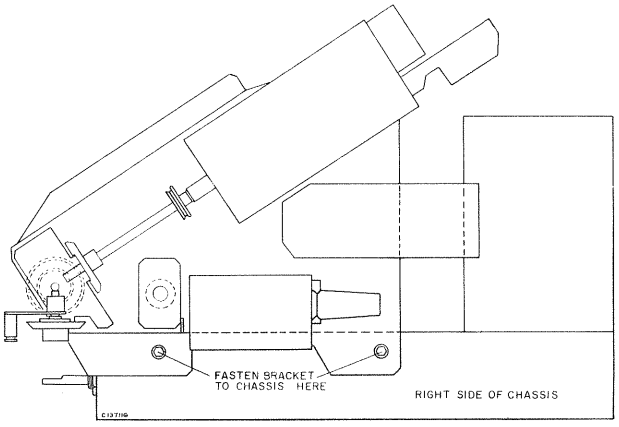


Figure 5—Tuner Bracket Fastened to Chassis

KINESCOPE HANDLING PRECAUTION.—Do not install, remove, or handle the kinescope in any manner, unless shatter-proof goggles are worn. People not so equipped should be kept away while handling the kinescope. Keep the kinescope away from the body while handling.

INSTALLATION OF KINESCOPE.—Wipe the kinescope screen surface and front panel safety glass clean of all dust and fingermarks with a soft cloth moistened with "Windex" or similar cleaning agent.

Replace the kinescope and chassis by reversal of the removing process. The kinescope should be installed so that the high voltage contact is to the right when looking at it from the rear of the cabinet.

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.

CHASSIS TOP VIEW

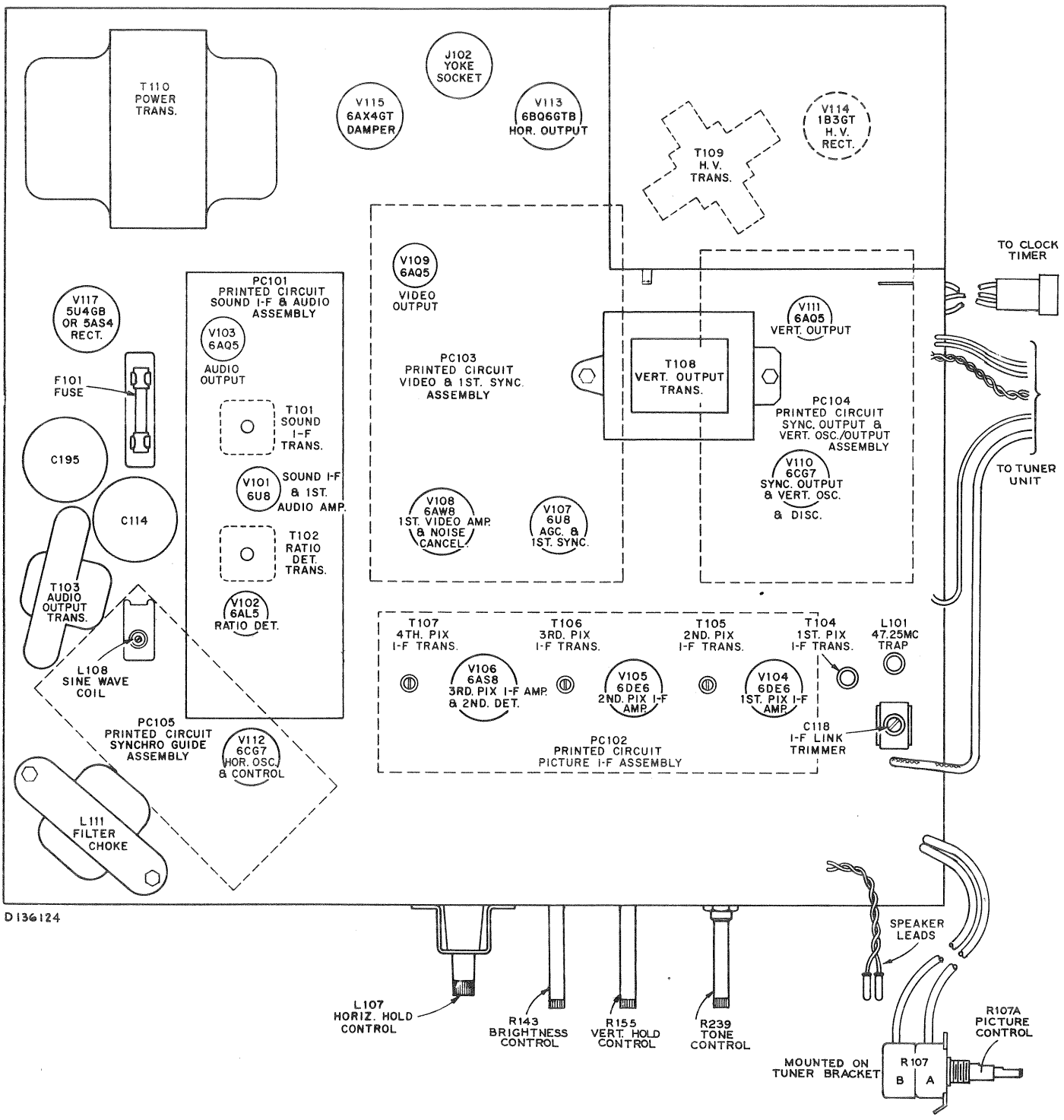


Figure 6—Chassis Top View

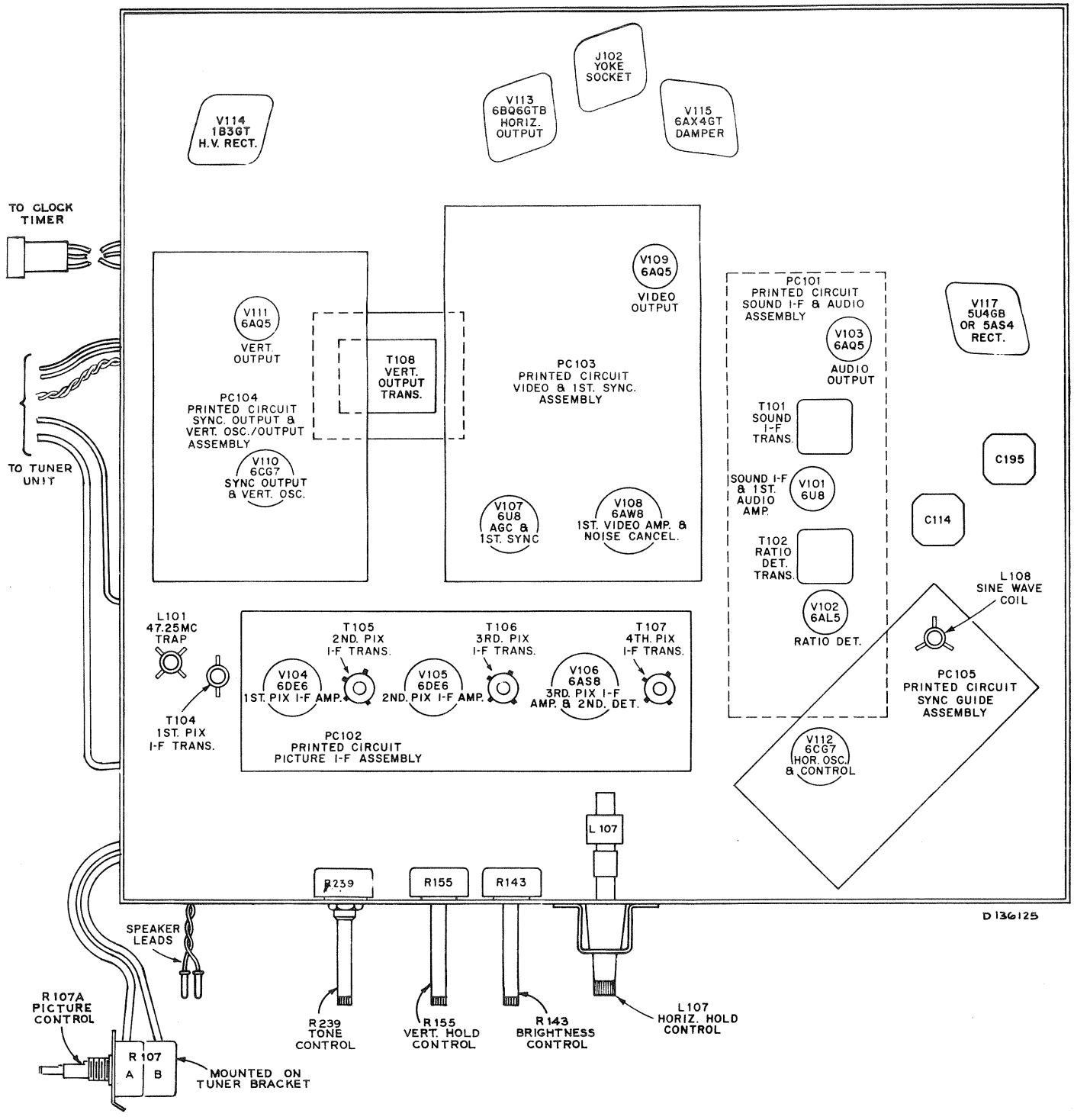


Figure 7—Chassis Bottom View

ALIGNMENT PROCEDURE

Set the UHF CHANGEOVER switch to the UHF position, and the UHF TUNING between channels 68 and 69 at 800 mc.

Connect a 220 ohm composition resistor and a 1500 mmf. capacitor in series between the plate, pin 1, of V1 6BQ7A and ground with the capacitor connected to pin 1 and the resistor to ground. This point is accessible through the hole in the left side of the tuner (refer to figure 19). Connect the oscilloscope diode probe to the junction between the resistor and capacitor.

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 terminal "F" of PC103 and ground the battery positive terminal to the chassis. Adjust the bias potentiometer to produce —3.0 volts of bias, as measured by the "VoltOhmyst" at terminal "F" of PC103.

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

Adjust C308, on the UHF section, and L9, on the VHF section, of the tuner for maximum gain with 45.75 mc. and 41.25 mc. markers as shown in figure 12.

Move the diode detector to test point TP3 and adjust L27 and L43 for curve as shown in figure 12.

Remove the resistor, capacitor and diode probe from TP3 and connect the oscilloscope to terminal "G" of PC102. Use 3.0v peak-to-peak on the oscilloscope.

Connect the VHF sweep generator to the VHF antenna terminals. Keep the AGC bias at —3.0 V and the I-F bias at —5.0 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 11. Retouch 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 UHF antenna terminals. Check on all UHF channels for proper wave shape as shown in figure 11, retouching L27 and L43 if necessary to correct any overall tilt.

Do not retouch C308, L9, T2, T104, T105, T106 or T107.

Remove the sweep and marker generators and the bias supplies.

KRK38B TUNER ALIGNMENT.—

Model 21-T-639

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 C2 all the way out. Set channel 7 to 13 oscillator slugs one turn from tight. Turn T1 slug all the way out. Do not change any of the adjustments in the antenna matching unit.

Disconnect the link from the terminals of T1 and shunt the terminals with a 39 ohm composition resistor.

Turn the receiver channel selector switch to channel 2.

The 43.5 mc. trap is adjusted with zero bias. To insure that the bias will remain constant, take a clip lead and short circuit the AGC terminal of the tuner at the terminal board to ground.

Connect the oscilloscope to the test point TP1 on top of the tuner unit. Set the oscilloscope to maximum gain.

Connect the output of the VHF signal generator to the output of the antenna matching unit at the junction of L53 and C24 at the bottom of the FM trap L53.

Tune the signal generator to 43.5 mc. and modulate it 30% with a 400 cycle sine wave. Adjust the signal generator for maximum output.

Adjust C19 on top of the tuner, for minimum 400 cycle indication on the oscilloscope. If necessary, this adjustment can be retouched in the field to provide additional rejection to one specific frequency in the i-f band pass. However, in such cases, care should be taken not to tune C19 into channel 2, thereby reducing sensitivity on channel 2.

Connect the potentiometer arm of one of the bias supplies 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 channel selector switch to channel 8.

Preset C5 to read —3.0 volts at the test point TP1, as read on the "VoltOhmyst." The limits for oscillator injection voltage are 2 volts minimum and not exceeding a maximum of 5.5 volts.

Turn the fine tuning control fully clockwise.

Adjust C3 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 C10. 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 C3 to obtain an audible beat with the signal generator.

Turn C2 clockwise until the beat note just begins to change, then turn one full turn in the same clockwise direction.

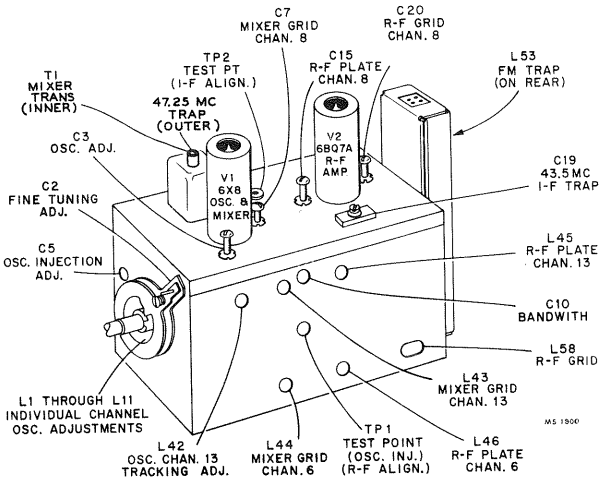


Figure 13—KRK38B Tuner Adjustments

Return the fine tuning to the center of its range.

Note.—If on some units, it is not possible to reach the proper channel 8 oscillator frequency by adjustment of C3, switch to channel 13 and adjust L42 to obtain proper channel 13 oscillator frequency as indicated in the table on page 8. Then, switch to channel 12 and adjust L11 to obtain proper channel 12 oscillator frequency. Continue down to channel 8, adjusting the appropriate oscillator trimmer to obtain the proper frequency on each channel. Then again on channel 8, adjust C3 to obtain proper channel 8 oscillator frequency. Switch back to channel 13 and readjust L42 and back to channel 8 and adjust C3.

Set the T1 core for maximum inductance (core turned counter-clockwise).

Connect the sweep generator through a suitable attenuator, as shown in figure 14, to the input terminals of the antenna matching unit.

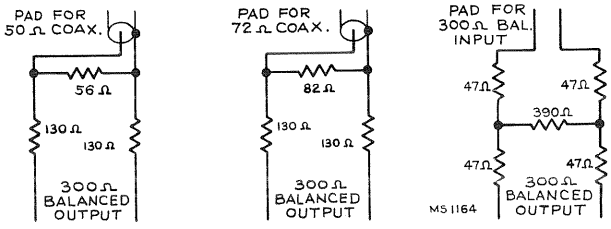


Figure 14—Sweep Attenuator Pads

Connect the signal generator loosely to the antenna terminals.

ALIGNMENT PROCEDURE

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 C7, C10, C15 and C20 for approximately correct curve shape, frequency, and band width as shown in figure 15.

The correct adjustment of C20 is indicated by maximum amplitude of the curve midway between the markers. C15 tunes the r-f amplifier plate circuit and affects the frequency of the pass band most noticeably. C7 tunes the mixer grid circuit and affects the tilt of the curve most noticeably (assuming that C20 has been properly adjusted). C10 is the coupling adjustment and hence primarily affects the response band width.

Connect the "VoltOhmyst" to test point TP1. Adjust C5 to read —3.0 volts dc on the "VoltOhmyst" at TP1. Readjust C2, C7, C10 and C15 for proper response. Adjust C20 for maximum gain at midpoint of the curve. Repeat if necessary until the proper response is obtained.

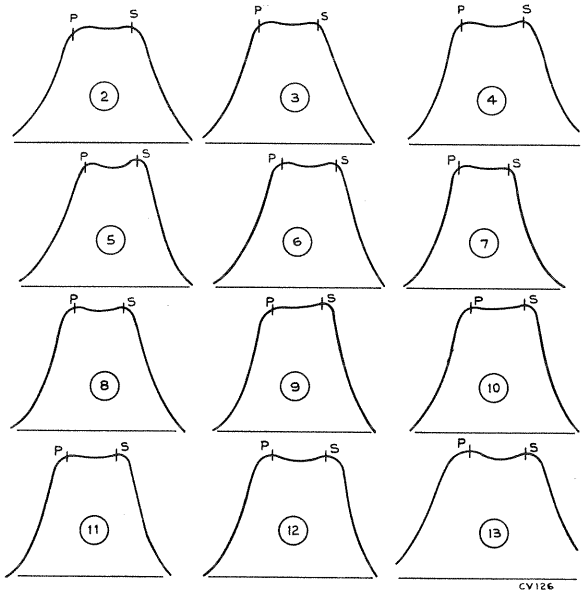


Figure 15—KRK38B Tuner R-F Responses

Set the receiver channel switch to channel 13.

Adjust the signal generator to the channel 13 oscillator frequency 257 mc.

Turn the fine tuning control fully clockwise.

Adjust L42 to obtain an audible beat. Slightly overshoot the adjustment of L42 by turning the slug an additional turn in the same direction from the original setting, then reset the oscillator to proper frequency by adjusting C2 to again obtain the beat.

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 L43 and L45 for proper response as shown in figure 15.

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 C5, turn the sweep and signal generators back on and recheck the channel 13 response. Readjust L43 and L45 if necessary.

Set the receiver channel selector switch to channel 8 and readjust C2 for proper oscillator frequency, 227 mc.

Set the sweep generator and signal generator to channel 8.

Readjust C7, C10, C15 and C20 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 C7 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.

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 L5 for an audible beat. Adjust L44, L46 and L58 for proper curve shape as shown in figure 15. Recheck the oscillator injection voltage at TP1, to insure that it is within the limits specified. Readjust C5 if necessary.

If C5 required adjustment, switch the receiver and the signal generator to channel 8. Readjust C7 for correct curve shape and recheck C2 and C3 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 15 for typical response curves. It should be found that all these channels have the proper response with the markers above 80% response.

If the markers fail to fall within this requirement readjust L44, L46 and L58 in order to obtain curves within the proper limits.

Switch the channel selector, signal generator and marker generator through channels 7 to 13 and observe the response curves, referring to figure 15 for proper wave shape. Check the injection voltage at each channel to be within limits. If necessary readjust C15, C7, or C10 to obtain the proper response.

With the receiver and signal generator on channel 13 adjust L42 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.

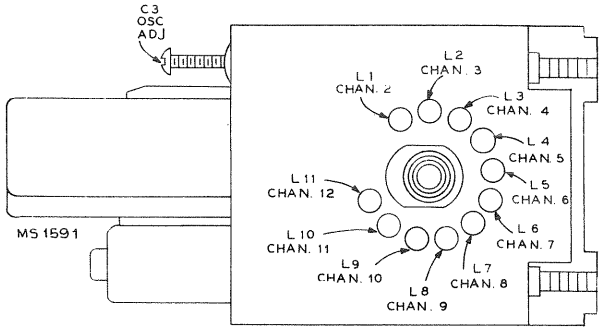


Figure 16—KRK38B Tuner Oscillator Adjustments

KRK38B or KRK38C ANTENNA MATCHING UNIT ALIGNMENT.—The antenna matching unit is accurately aligned at the factory. Adjustment of this unit should not be attempted in the customer's home since even slight misalignment may cause serious attenuation of the signal especially on channel 2. The r-f unit is aligned with a particular antenna matching transformer in place. If for any reason, a new antenna matching transformer is installed, the r-f 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

ALIGNMENT PROCEDURE

from the F-M trap L53 (L5) to the channel selector switch S1D (S1E).

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 1 of V105.

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

Remove the first pix i-f amplifier tube V104.

Connect the positive terminal of a bias box to the chassis and the potentiometer arm to the junction of R119 and R188. Set the potentiometer to produce approximately —5.0 volts of bias at the junction of R119 and R188.

Connect an oscilloscope to terminal "G" of PC102 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 KRK38C matching units are not slug tuned and therefore must be knifed for adjustment except those units in which C1, C2 and C3 are variable.

Tune the signal generator to 45.75 mc. and adjust the generator output to give an indication on the oscilloscope. Adjust L4 or L54 (core or knife coil) or C3 in the antenna matching unit for minimum audio indication on the oscilloscope.

Tune the signal generator to 41.25 mc. and adjust L1 or L57 (core or knife coil) or C1 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 or L53 to ground, keeping the leads as short as possible.

Connect an oscilloscope low capacity crystal probe from L5 or L53 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 14 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 L2 or L56 and L3 or L55 (core or knife coil) or C2 to obtain the response shown in figure 17. L3 or L55 is most effective in locating the position of the shoulder of the curve at 52 mc. and L2 or L56 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 or L53 F-M trap for maximum inductance to eliminate distortion when adjusting the matching unit. Be sure to return the L5 or L53 slug to its original position after adjusting the matching unit to prevent attenuation on channel 5 or 6.)

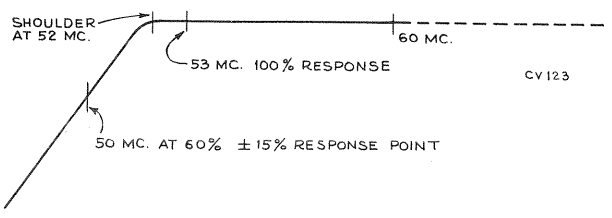


Figure 17—KRK38B or KRK38C Antenna Matching Unit Response

Restore the connection between L5 (L53) and S1D (S1E). Replace V104.

KRK38C TUNER ALIGNMENT

Model 21-T-639U

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 C27 all the way out. Set channel 7 to 13 oscillator slugs one turn from tight. Turn T2 slug all the way out. Do not change any of the adjustments in the antenna matching unit.

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

Turn the receiver channel selector switch to channel 2.

The 43.5 mc. trap is adjusted with zero bias. To insure that the bias will remain constant, take a clip lead and short circuit the AGC terminal of the tuner at the terminal board to ground.

Connect the oscilloscope to the test point TP2 on top of the tuner unit. Set the oscilloscope to maximum gain.

Connect the output of the VHF signal generator to the output of the antenna matching unit at the junction of L5 and C4 at the bottom of the FM trap L5.

Tune the signal generator to 43.5 mc. and modulate it 30% with a 400 cycle sine wave. Adjust the signal generator for maximum output.

Adjust C33 on top of the tuner, for minimum 400 cycle indication on the oscilloscope. If necessary, this adjustment can be retouched in the field to provide additional rejection to one specific frequency in the i-f band pass. However, in such cases, care should be taken not to tune C33 into channel 2, thereby reducing sensitivity on channel 2.

Connect the potentiometer arm of one of the bias supplies 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 channel selector switch to channel 8.

Preset C22 to read —3.0 volts at the test point TP1, as read on the "VoltOhmyst." The limits for oscillator injection voltage are 2 volts minimum and not exceeding a maximum of 5.5 volts.

Turn the fine tuning control fully clockwise.

Adjust C25 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 C16. 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 C25 to obtain an audible beat with the signal generator.

Turn C27 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.

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 L49 to obtain proper channel 13 oscillator frequency as indicated in the table on page 8. Then, switch to channel 12 and adjust L60 to obtain proper channel 12 oscillator frequency. Continue down to channel 8, adjusting the appropriate oscillator trimmer to obtain the proper frequency of each channel. Then again on channel 8, adjust C25 to obtain proper channel 8 oscillator frequency. Switch back to channel 13 and readjust L49 and back to channel 8 and adjust C25.

Set the T2 core for maximum inductance (core turned counter-clockwise).

Connect the sweep generator through a suitable attenuator, as shown in figure 14 to the input terminals of the antenna matching unit.

ALIGNMENT PROCEDURE

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 C21, C16, C11 and C7 for approximately correct curve shape, frequency, and band width as shown in figure 18.

The correct adjustment of C7 is indicated by maximum amplitude of the curve midway between the markers. C11 tunes the r-f amplifier plate circuit and affects the frequency of the pass band most noticeably. C21 tunes the mixer grid circuit and affects the tilt of the curve most noticeably (assuming that C7 has been properly adjusted). C16 is the coupling adjustment and hence primarily affects the response band width.

Connect the "VoltOhmyst" to test point TP1. Adjust C22 to read —3.0 volts dc on the "VoltOhmyst" at TP1. Readjust C27, C21, C16 and C11 for proper response. Adjust C7 for maximum gain at midpoint of the curve. Repeat if necessary until the proper response is obtained.

Set the receiver channel switch to channel 13.

Adjust the signal generator to the channel 13 oscillator frequency 257 mc.

Turn the fine tuning control fully clockwise.

Adjust L49 to obtain an audible beat. Slightly overshoot the adjustment of L49 by turning the slug an additional turn in the same direction from the original setting, then reset the oscillator to proper frequency by adjusting C27 to again obtain the beat.

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 L36 and L20 for proper response as shown in figure 18.

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 C22, turn the sweep and signal generators back on and recheck the channel 13 response. Readjust L36 and L20 if necessary.

Set the receiver channel selector switch to channel 8 and readjust C27 for proper oscillator frequency, 227 mc.

Set the sweep generator and signal generator to channel 8.

Readjust C21, C16, C11 and C7 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 C21 was adjusted in the recheck of channel 8 response.

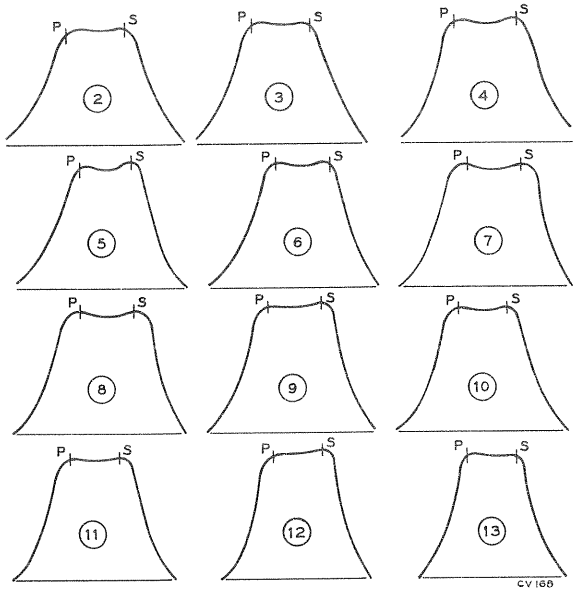
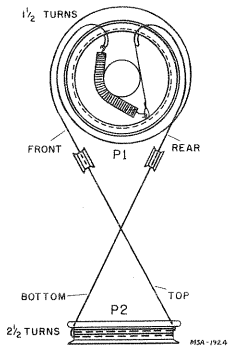


Figure 18—KRK38C Tuner VHF R-F Responses

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.



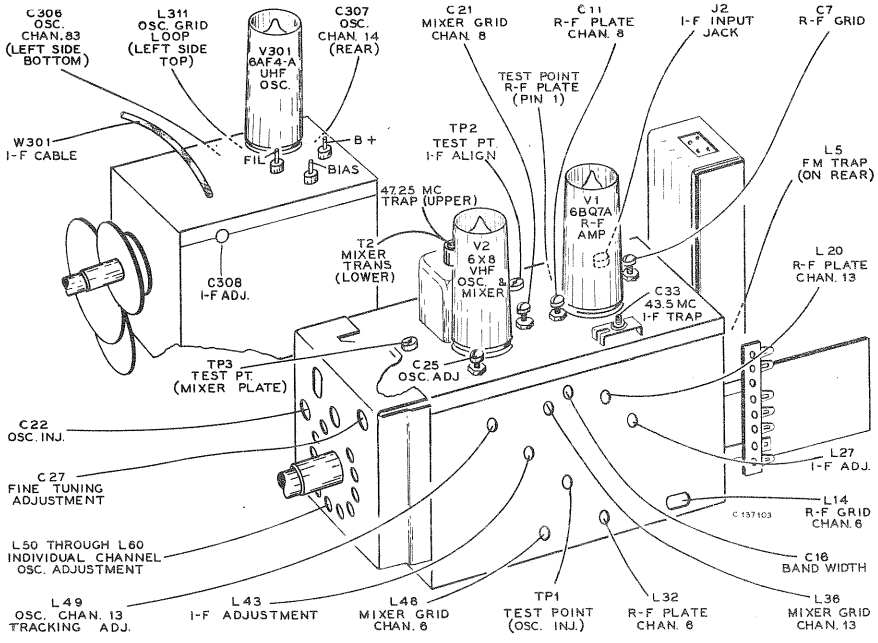


Figure 19—KRK38C Tuner Adjustments

ALIGNMENT PROCEDURE

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 L54 for an audible beat. Adjust L14, L48 and L32 for proper curve shape as shown in figure 18. Recheck the oscillator injection voltage at TP1, to insure that it is within the limits specified. Readjust C22 if necessary.

If C22 required adjustment, switch the receiver and the signal generator to channel 8. Readjust C21 for correct curve shape and recheck C27 and C25 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 18 for typical response curves. It should be found that all these channels have the proper response with the markers above 80% response.

If the markers fail to fall within this requirement readjust L48 and L32 in order to obtain curves within the proper limits.

Switch the channel selector, signal generator and marker generator through channels 7 to 13 and observe the response curves, referring to figure 18 for proper wave shape. Check the injection voltage at each channel to be within limits. If necessary readjust C11, C21 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.

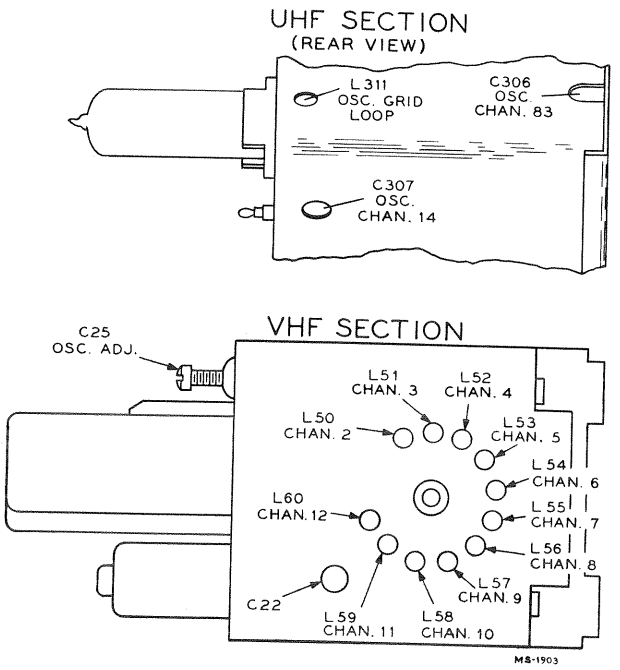


Figure 20—KRK38C Tuner Oscillator Adjustments

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.

UHF ALIGNMENT.—Alignment of the UHF section RF and IF adjustments require removal of the tuner shield which may be done only with the UHF tuner separate from its mounting, on some receivers. Oscillator adjustment may be accomplished without removing the tuner.

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

Connect the oscilloscope 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 rear split gear on the tuner condenser 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. 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 21(A).

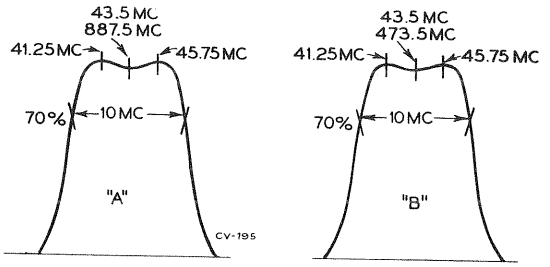


Figure 21—KRK38C Tuner UHF R-F Responses

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 21(A).

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

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 on some units, may be repositioned, if necessary, to bring the oscillator trimmer within range. Refer to figure 19 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 three markers will be on the top of the response curves, however, mistracking to the extent that the 41.25 mc. and 45.75 mc. ride down the sides of the curves to a point not less than 70% will not seriously affect the alignment. Should the markers fall below this level, it will be necessary to knife the RF plates to correct the mistracking. 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. Check which section requires knifing by touching the plates with the knifing tool while observing the response, then proceed with the knifing of the proper section or of both sections if required.

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 .35 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 "bias" terminal of the tuner (refer to figure 19). A reading between 0.5 and 2.5 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.

RATIO DETECTOR ALIGNMENT.—Set the signal generator at 4.5 mc. and connect it to the first video amplifier grid, pin 7 of V108A (terminal "M" of PC103), in series with a .01 mfd. capacitor.

As an alternate source of signal, the RCA WR39B or WR39C calibrator may be employed. In such a case, connect the calibrator to the grid of the third pix i-f amplifier, pin 2 of V106A.

Set the frequency of the calibrator to 45.75 mc. (pix carrier) and modulate with 4.5 mc. crystal. The 4.5 mc. signal will be picked off at pin 9 of V108A and amplified through the sound i-f amplifier.

Connect the "VoltOhmyst" to pin 7 of V102 (terminal "F" of PC101).

Tune the ratio detector primary, T102 top core for maximum d-c output on the "VoltOhmyst." (Peak with core at end of coil away from chassis.) Adjust the signal level from the signal generator for 5 volts on the "VoltOhmyst" when finally peaked. This is approximately the operating level of the ratio detector for average signals.

Connect the "VoltOhmyst" to the junction of R106 and C105 (terminal "D" of PC101).

Tune the ratio detector secondary T102 bottom core for zero d-c on the "VoltOhmyst." (Adjust with core at chassis end of coil.)

Repeat adjustments of T102 top for maximum d-c at pin 7 of V102 and T102 bottom for zero d-c at the junction of R106 and C105. Make the final adjustments with the signal input level adjusted to produce 5 volts d-c on the "VoltOhmyst" at pin 7 of V102.

SOUND TAKE-OFF ALIGNMENT.—Connect the signal generator to the first video amplifier grid, pin 7 of V108A (terminal "M" of PC103).

As an alternate source of signal, the RCA WR39B or WR39C calibrator may be employed as above.

Connect the "VoltOhmyst" to pin 7 of V102 (terminal "F" of PC101).

Tune the T101 top core for maximum d-c on the "VoltOhmyst." (Peak with core at chassis end of coil.)

The output from the signal generator should be set to produce approximately 5 volts on the "VoltOhmyst" when the final touches on the above adjustment are made.

4.5 MC. TRAP ADJUSTMENT.—Connect the signal generator in series with a .01 mf. capacitor to pin 7 of V108A (terminal "M" of PC103). Set the generator to 4.5 mc. and modulate it 30% with 400 cycles. Set the output to approximately 0.5 volt.

Short the third pix i-f grid to ground, pin 2, V106A, to prevent noise from masking the output indication.

Set the picture control R107A to its maximum clockwise position.

Connect the crystal diode probe of an oscilloscope to terminal "A" of PC103.

Adjust the core of L104 for minimum output on the oscilloscope.

Remove the short from pin 2, V106A to ground.

As an alternate method, this step may be omitted at this point in the alignment procedure and the adjustment made "on the air" after the alignment is completed.

If this is done, tune in a station and observe the picture on the kinescope. If no 4.5 mc. beat is present in the picture, when the fine tuning control is set for proper oscillator-frequency, then L104 requires no adjustment. If a 4.5 mc. beat is present, turn the fine tuning control slightly clockwise so as to exaggerate the beat and then adjust L104 for minimum beat.

AGC AND NOISE LIMITER ADJUSTMENTS.—Disconnect all test equipment except the oscilloscope which should be connected to pin 1 of V109.

Connect an antenna to the receiver antenna terminals.

Tune in a strong signal and adjust the oscilloscope to see the video waveform.

Turn the Noise Limiter control fully clockwise.

From a counter-clockwise position, advance the AGC control until the tips of sync become compressed then counter-clockwise until no compression is observed.

Observe the peak-to-peak voltage on the oscilloscope and adjust the AGC control for a reading 60% of the original value observed.

Set the fine tuning control until a 4.5 mc. sound beat is just perceptible in the picture.

Readjust the AGC control clockwise until compression occurs then counter-clockwise until the compression just disappears.

Set the horizontal hold control as far counter-clockwise as possible without making the horizontal sync unstable.

Adjust the noise limiter control counter-clockwise until sync tips show compression then clockwise until the compression just disappears.

Return the horizontal hold control to the center of its holding range.

Remove the oscilloscope from pin 1 of V109.

HORIZONTAL OSCILLATOR AND OUTPUT ALIGNMENT.—Normally the alignment of the horizontal oscillator is not considered to be a part of the alignment procedure, but since the oscillator waveform adjustment may require the use of an oscilloscope, it can not be done conveniently in the field. The waveform adjustment is made at the factory and normally should not require readjustment in the field. However, the waveform adjustment should be checked whenever the receiver is aligned.

The proper setting of the width and drive adjustments, as outlined, on page 4, should be made before making adjustment of the sine wave coil L108.

Place a jumper across the terminals of the sine wave coil L108 and adjust the horizontal hold control until the picture pulls into sync. Remove the short across the sine wave coil.

Connect the low capacity probe of an oscilloscope to terminal "F" of PC105. Turn the horizontal hold control clockwise until the picture falls out of sync, then counter-clockwise until the picture just pulls into sync. The pattern on the oscilloscope should be as shown in Figure 22C. Adjust the sine wave adjustment core L108 until the two peaks are at the same height. During this adjustment, the picture must be kept in sync by readjusting the horizontal hold control if necessary.

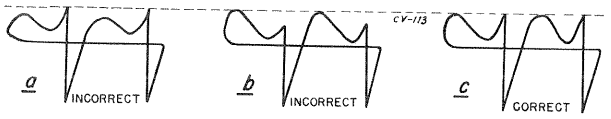


Figure 22—Horizontal Oscillator Waveforms

This adjustment is very important for correct operation of the circuit. If the broad peak of the wave on the oscilloscope is lower than the sharp peak, the noise immunity becomes poorer, the stabilizing effect of the tuned circuit is reduced and drift of the oscillator may occur. On the other hand, if the broad peak is higher than the sharp peak, the oscillator is overstabilized, the pull-in range becomes inadequate and the broad peak can cause double triggering of the oscillator when the hold control approaches the clockwise position.

Remove the oscilloscope upon completion of this adjustment.

Horizontal Drive Adjustment.—Turn the horizontal hold control until the picture falls out of sync with the diagonal lines sloping down to the left. Slowly turn the horizontal control counter-clockwise and note the number of diagonal bars obtained just before the picture pulls into sync.

Pull-in should occur with one and one-half to three bars present.

Set the width control fully counter-clockwise.

With the horizontal control set at the pull-in point, adjust the horizontal drive trimmer C162 counter-clockwise for a bright vertical line in the center of the picture. Turn the trimmer clockwise until the line just disappears. If no line appears set the drive trimmer fully counter-clockwise.

Set the brightness control to normal and adjust the width control so the picture overscans the mask ¾" at each side with normal line voltage (117V. AC). Readjust the horizontal drive trimmer as above.

The picture should pull into sync with one and one-half to three bars present, remain in sync for approximately two full turns counter-clockwise from pull-in, and fall out of sync with between 2 and 5 bars present before interrupted oscillation (motorboating) occurs.

ALIGNMENT DATA

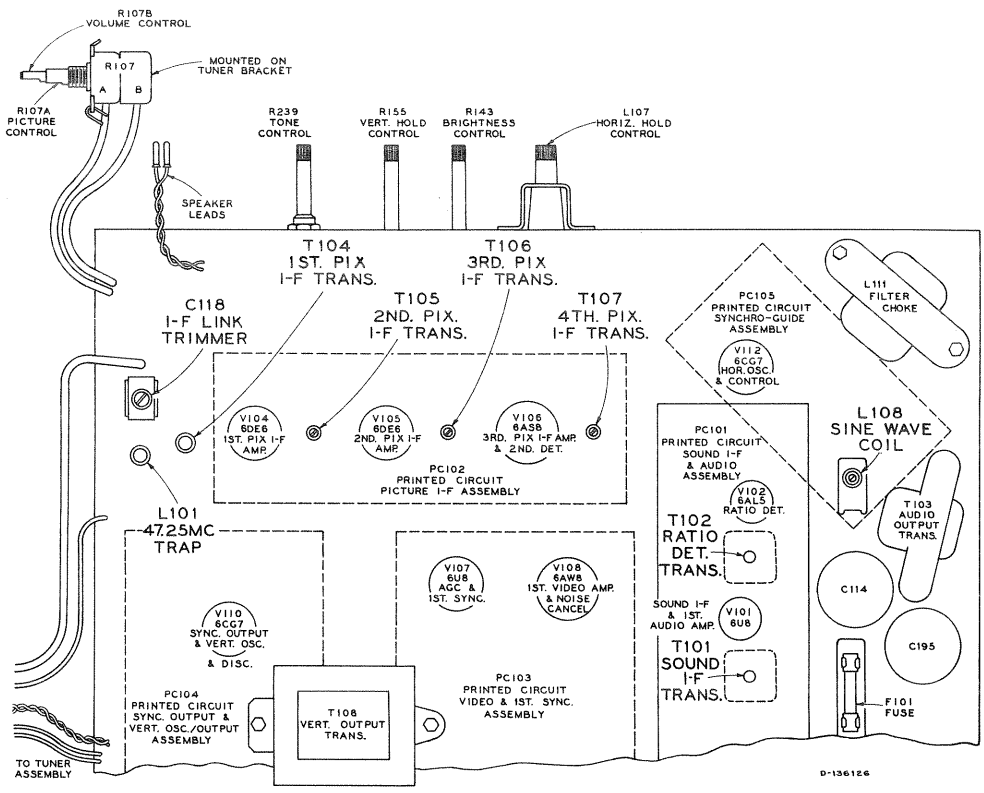


Figure 23—Top Chassis Adjustments

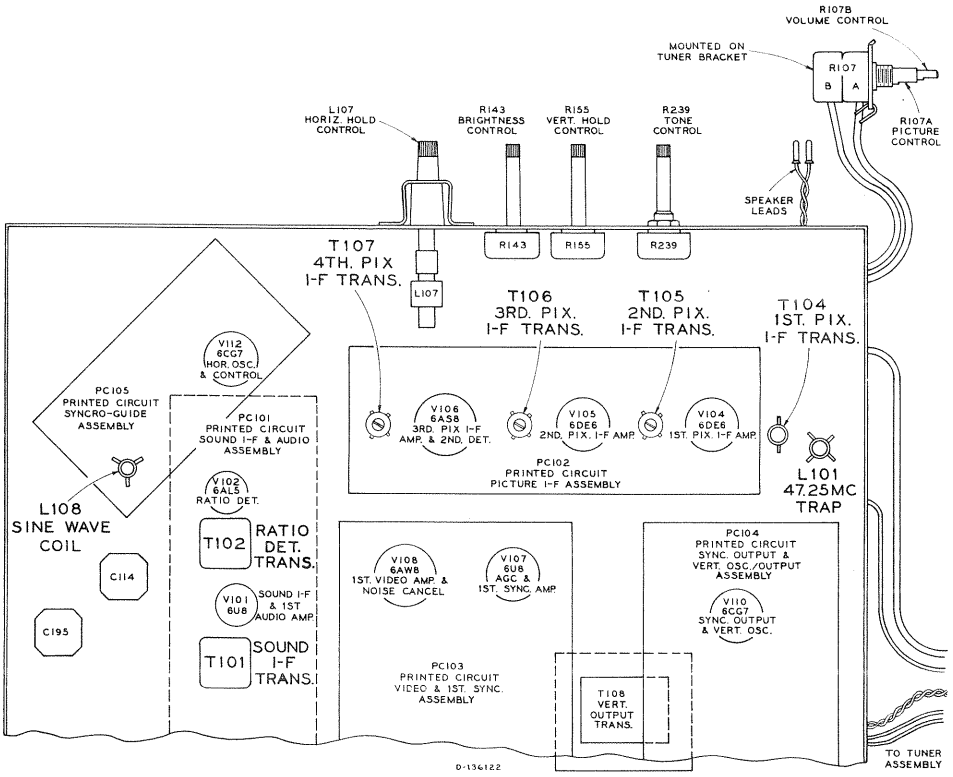


Figure 24—Bottom Chassis Adjustments

ALIGNMENT TABLE

THE DETAILED ALIGNMENT PROCEDURE BEGINNING ON PAGE 8 SHOULD BE READ BEFORE ALIGNMENT BY USE OF THE TABLE IS ATTEMPTED

Step No.	CONNECT VHF SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT VHF SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT HETERODYNE FREQ. METER TO	HET. METER FREQ. MC.	CONNECT OSCILLOSCOPE TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
ANTENNA MATCHING UNIT ALIGNMENT (ALL TUNERS)										
1	Do not adjust this unit unless fairly certain that it requires adjustment. Disconnect lead from L53 (L5) to S1D (S1E). Connect output of matching unit through 1000 mmf. to pin 1 of V105. Replace cover on matching unit. Remove V104 from socket. Connect bias box to junction of R119 and R188 and set to produce −5 volts.									
2	Antenna terminals	45.75 mc. 30% mod.	Not used	—	Not used	—	Term. "G" of PC-102. Scope gain to max.	—	L4 or L54 (core or knife coil) or C3 for min. audio on scope	Fig. 13
3	"	41.25 mc. 30% mod.	"	—	"	—	"	—	L1, L57 or C1 for min. audio on scope	Fig. 13
4	Antenna terminals loosely	—	Antenna terminals through pad	45 to 54 mc.	"	—	Scope xtal probe from L5 or L53 to ground	Connect 300 ohms from L5 or L53 to gnd.	L3 or L55 and L2 or L56 (or C2) to obtain response of Fig. 17	Fig. 13 Fig. 17
5	Remove bias supply, crystal probe, pad and 300 ohm resistor. Restore connection between L5 (L53) and S1D (S1E). Replace V104.									
VHF TUNER ALIGNMENT										
6	If unit is completely out of adjustment, preset all adjustments to center of range with following exceptions. Set T1 and C2 fully counterclockwise. Set channel 7 to 13 oscillator slugs one turn from tight. Disconnect link from T1. Terminate T1 with 39 ohms. Short the AGC terminal to ground. Preset C5 to read −3.0v dc. at TP1.									
7	Junction of L53 and C24 at bottom of L53	43.5 mc. 30% mod. at 400 Cy.	Not used	—	Not used	—	TP1. Gain to maximum	Set tuner unit on channel 2	C19 for min. indication on scope	Fig. 13
8	Not used	—	Not used	—	Loosely to tuner unit oscillator,	227 mc.	Not used	Tuner unit on channel 8. Insert −3V bias at AGC terminal	C3 for beat on freq. meter. Fine tuning fully clockwise	Fig. 13
9	"	—	"	—	"	"	"	Return fine tuning to midrange after adjustment of C2	C2 one turn clockwise past change in beat note	Fig. 13
10	Antenna terminals loosely	181.25 and 185.75	Antenna terminals through pad	Channel 8	Not used	—	TP1. Gain to maximum	Tuner unit on channel 8. Set T1 max. counterclockwise	C7, C10, C15 and C20 for response shown in Fig. 15	Fig. 13 Fig. 15
11	Not used	—	Not used	—	Not used	—	Not used	On channel 8. Connect "VoltOhmyst" to TP1	C5 for −3.0 volts on meter	Fig. 13
12	Antenna terminals loosely	181.25 and 185.75	Antenna terminals through pad	Channel 8	Not used	—	TP1. Gain to maximum	Tuner unit on channel 8	Check response. Readjust C7, C10, C15 and C20 if necessary	Fig. 13 Fig. 15
13	Not used	—	Not used	—	Loosely to tuner unit oscillator	257 mc.	Not used	Rec. on channel 13. Fine tuning fully clockwise	L42 for beat on het. freq. meter. Overshoot L42 slightly and adjust C2 for beat	Fig. 13
14	Antenna terminals loosely	211.25 215.75	Antenna terminals through pad	Channel 13	Not used	—	TP1. Gain to maximum	Rec. on channel 13 "VoltOhmyst" on TP1	L43 and L45 for proper response and osc. injection within limits	Fig. 15
15	If C5 was readjusted in step 14, repeat step 13 and step 14 until the conditions specified in each step are fulfilled without additional adjustments.									
16	Not used	—	Not used	—	Loosely to tuner unit oscillator	227 mc.	Not used	Tuner unit on channel 8	C2 for beat on freq. meter	Fig. 13
17	Antenna terminals loosely	181.25 and 185.75	Antenna terminals through pad	Channel 8	Not used	—	TP1. Gain to maximum	"	Check, response adjust C7, C10, C15 and C20 if necessary	Fig. 15
18	If C7 was readjusted in step 17 recheck the oscillator injection. Repeat steps 8 to 17 until all conditions are satisfied.									
19	Not used	—	Not used	—	Loosely to tuner unit oscillator	129 mc.	Not used	Tuner unit on channel 6. Fine tuning midrange	L5 for beat on het. freq. meter	Fig. 13
20	Antenna terminals loosely	83.25 and 87.75	Antenna terminals through pad	Channel 6	Not used	—	TP1. Gain to maximum	"	L44, L46 and L58 for response shown in Fig. 15	Fig. 13 Fig. 15
21	"	83.25 87.75	"	Channel 6	"	—	"	Rec. on channel 6. "VoltOhmyst" on TP1	Check to see that response is correct and osc. injection is within limits	Fig. 13 Fig. 15
22	"	77.25 81.75	"	Channel 5	"	—	"	Rec. on channel 5	"	Fig. 15
23	"	67.25 71.75	"	Channel 4	"	—	"	Rec. on channel 4	"	Fig. 15
24	"	61.25 65.75	"	Channel 3	"	—	"	Rec. on channel 3	"	Fig. 15
25	"	55.25 59.75	"	Channel	"	—	"	Rec. on channel 2	"	Fig. 15
26	If the response of any channel (steps 21 through 25) is below 80% at either marker, adjust L44, L46 and L58 as necessary to obtain proper response yet maintain correct response on channel 8.									
27	Repeat steps 19 through 25 until all adjustments are obtained.									
28	Antenna terminals loosely	211.25 215.75	Antenna terminals through pad	Channel 13	Not used	—	TP1. Gain to maximum	Rec. on channel 13 "VoltOhmyst" on TP1	Check to see that response is correct and osc. injection within limits	Fig. 13 Fig. 15
29	"	205.25 209.75	"	Channel 12	Not used	—	"	Rec. on channel 12	"	Fig. 15
30	"	199.25 203.75	"	Channel 11	"	—	"	Rec. on channel 11	"	Fig. 15
31	"	193.25 197.75	"	Channel 10	"	—	"	Rec. on channel 10	"	Fig. 15
32	"	187.25 191.75	"	Channel 9	"	—	"	Rec. on channel 9	"	Fig. 15
33	"	181.25 185.75	"	Channel 8	"	—	"	Rec. on channel 8	"	Fig. 15
34	"	175.25 179.75	"	Channel 7	"	—	"	Rec. on channel 7	"	Fig. 15
35	Check r-f response and oscillator injection on channels 7 through 13, adjusting C7, C10 or C15 if necessary, stopping on channel 13 for the next step.									
36	Not used	—	Not used	—	Loosely coupled to r-f oscillator	257 mc.	TP1. Gain to maximum	Rec. on channel 13	L42 for beat on het. freq. meter	Fig. 13

CRITICAL LEAD DRESS

1. Dress twisted-pair AC leads away from phono jack.
2. White/brown lead from PC101A to S103 should be dressed away from horizontal coil and leads.
3. Dress the green lead and the yellow lead on the kinescope socket through separate holes at the rear of the chassis. These leads should not rest on the chassis.
4. White/green lead from R198 to PC103-K should be dressed away from L110.
5. Keep body of C101 dressed close to terminal "R" of PC103.
6. Dress the three leads to L107 separated from each other and away from the chassis.
7. The AGC lead from terminal "H" of PC103 to the terminal board on rear apron should be kept close to the chassis.
8. Dress all power transformer leads away from phono jack.
9. Dress all 2-watt resistors away from each other and all wires and components.
10. Dress all shielded leads under lances provided.

RESPONSE PHOTOGRAPHS

Taken from RCA WO58A Oscilloscope

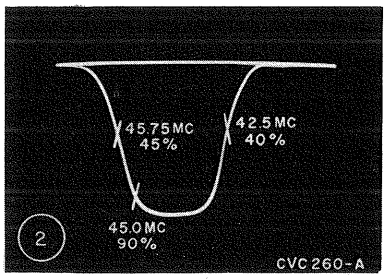


Figure 25—Over-all Pix I-F Response

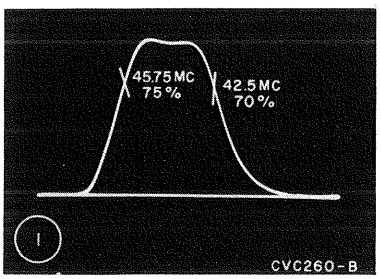


Figure 26—Response of T1-T104 Pix I-F Transformers

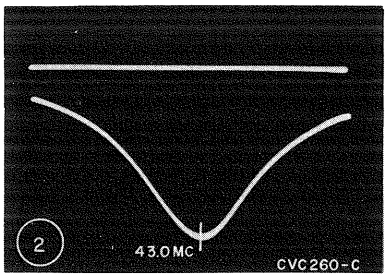


Figure 27—Response of T105 Pix I-F Transformer

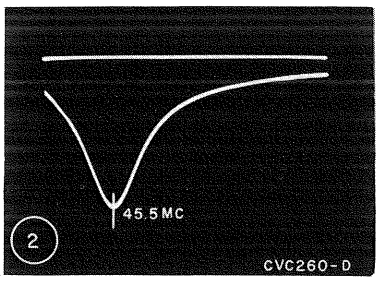


Figure 28—Response of T106 Pix I-F Transformer

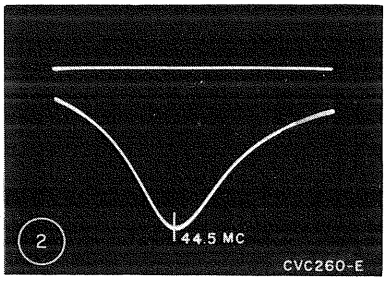


Figure 29—Response of T107 Pix I-F Transformer

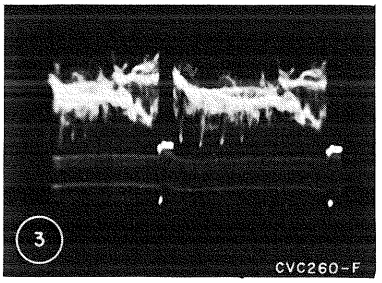
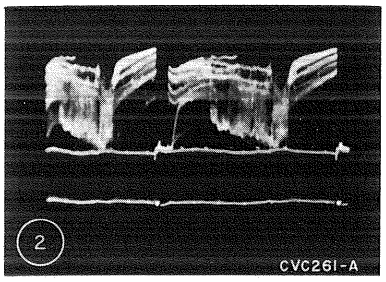


Figure 30—Grid of Kinescope (Pin 2 of V116)

Voltage depends on picture

WAVEFORM PHOTOGRAPHS

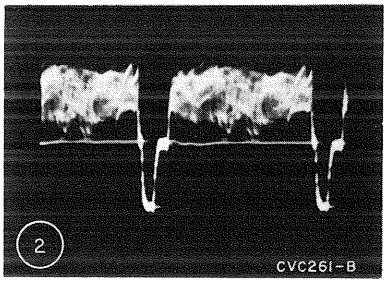
Taken from RCA WO58A Oscilloscope



Grid of Video Amplifier
(Pin 7 of V108A) (6AW8)
Voltage depends on picture

Figure 31—Vertical (Oscilloscope Synced to ½ of Vertical Sweep Rate) (3.5 Volts PP)

Figure 32—Horizontal (Oscilloscope Synced to ½ of Horizontal Sweep Rate) (3.5 Volts PP)



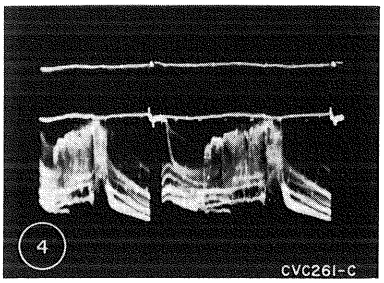
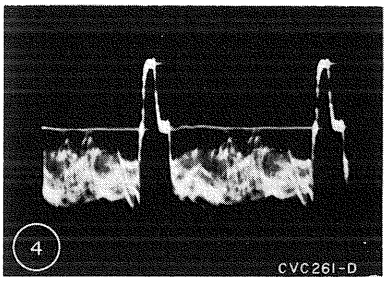


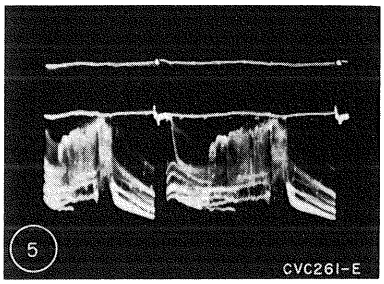
Plate of Video Amplifier
(Pin 9 of V108A) (6AW8)

Voltage depends on picture

Figure 33—Vertical (55 Volts PP)

Figure 34—Horizontal (55 Volts PP)



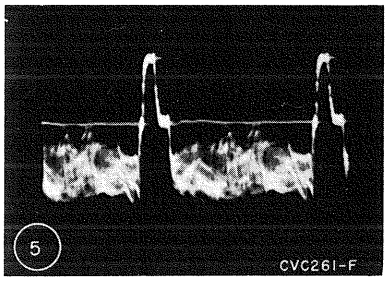


Grid of Video Output
(Pin 7 of V109) (6AQ5)

Voltage depends on picture

Figure 35—Vertical (18 Volts PP)

Figure 36—Horizontal (18 Volts PP)



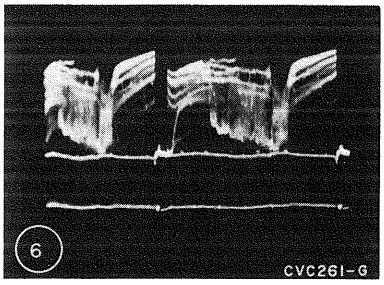
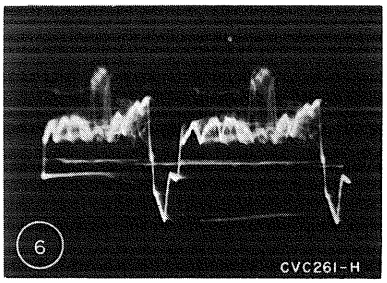


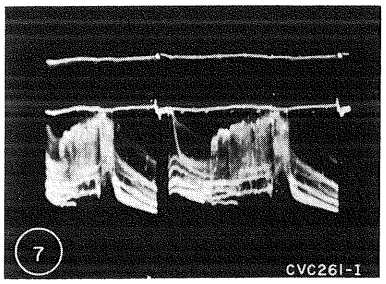
Plate of Video Output
(Pin 5 of V109) (6AQ5)

Voltage depends on picture

Figure 37—Vertical (70 Volts PP)

Figure 38—Horizontal (70 Volts PP)



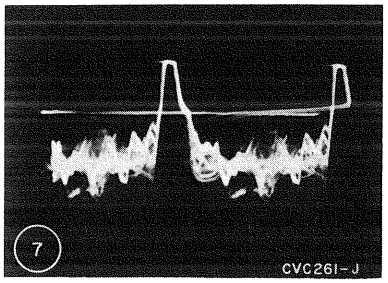


Grid of 1st Sync Amplifier
(Pin 9 of V107A) (6U8)

Voltage depends on picture

Figure 39—Vertical (25.5 Volts PP)

Figure 40—Horizontal (25.5 Volts PP)



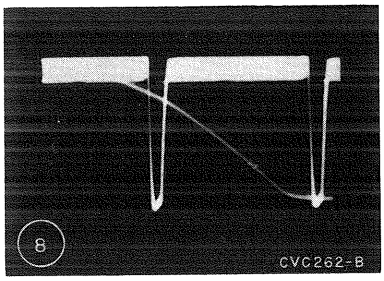
WAVEFORM PHOTOGRAPHS

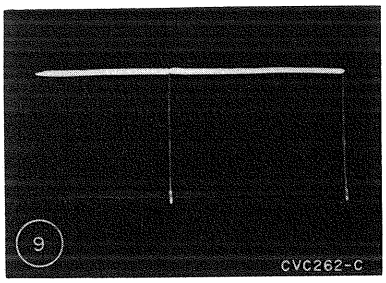
Taken from RCA WO58A Oscilloscope

Plate of 1st Sync Amplifier (Pin 1 of V107A) (6U8)

Figure 41—Vertical (23 Volts PP)

Figure 42—Horizontal (23 Volts PP)

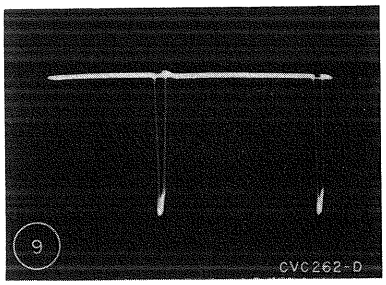




Grid of Sync Output (Pin 2 of V110A) (6CG7)

Figure 43—Vertical (21 Volts PP)

Figure 44—Horizontal (21 Volts PP)



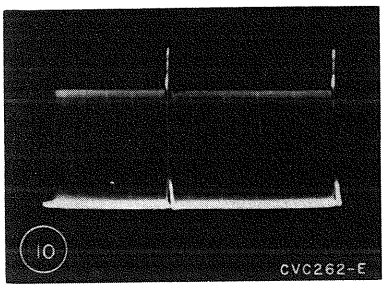
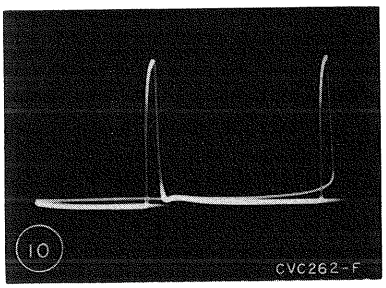


Plate of Sync Output (Pin 1 of V110A) (6CG7)

Figure 45—Vertical (85 Volts PP)

Figure 46—Horizontal (85 Volts PP)



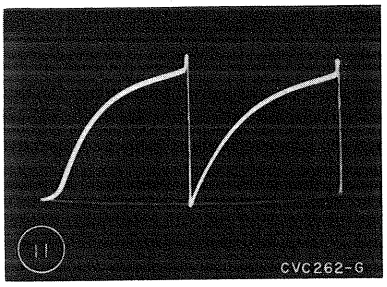
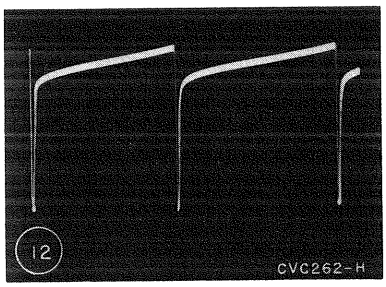


Figure 47—Grid of Vertical Sweep Osc. (Pin 7 of V110B) (6CG7) (170 Volts PP)

Figure 48—Plate of Vertical Sweep Osc. (Pin 6 of V110B) (6CG7) (130 Volts PP)



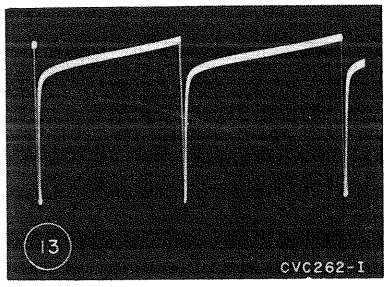
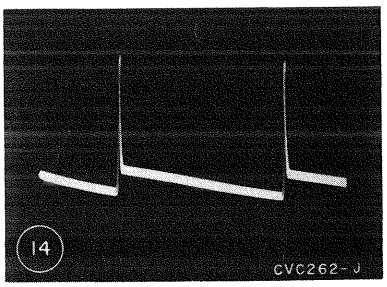


Figure 49—Grid of Vertical Sweep Output (Pin 1 of V111) (6AQ5) (130 Volts PP)

Figure 50—Plate of Vertical Sweep Output (Pin 5 of V111) (6AQ5) (305 Volts PP)



WAVEFORM PHOTOGRAPHS

Taken from RCA WO58A Oscilloscope

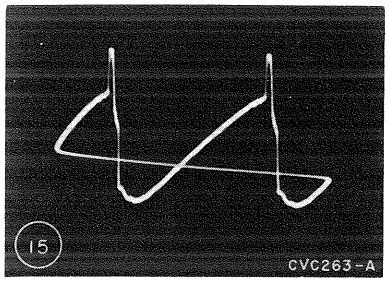
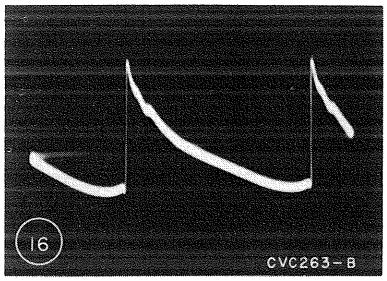


Figure 51—Grid of Horizontal Oscillator Control (Pin 2 of V112) (6CG7) (28.5 Volts PP)

Figure 52—Cathode of Horizontal Oscillator Control (Pin 3 of V112) (6CG7) (1.2 Volts PP)



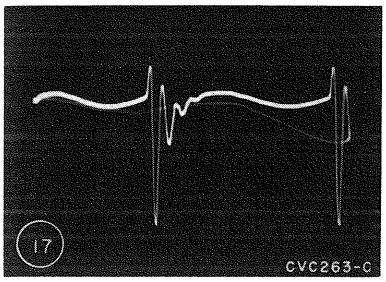
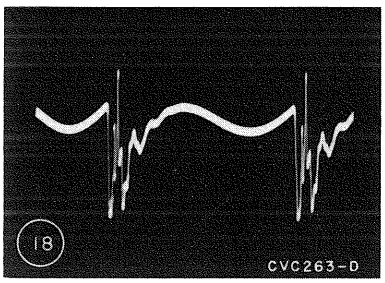


Figure 53—Grid of Horizontal Oscillator (Pin 7 of V112) (6CG7) (320 Volts PP)

Figure 54—Plate of Horizontal Oscillator (Pin 6 of V112) (6CG7) (190 Volts PP)



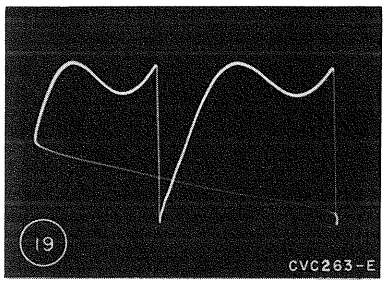
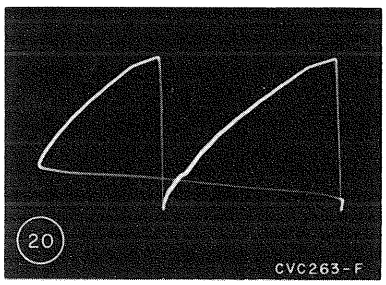


Figure 55—Terminal "F" of PC105 (130 Volts PP)

Figure 56—Grid of Horizontal Sweep Output (Pin 5 of V113) (6BQ6GTB) (100 Volts PP)



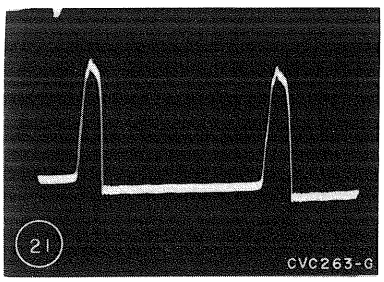
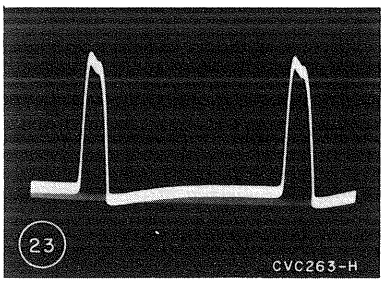


Figure 57—Plate of Horizontal Output (Approx. 5000 Volts PP) (Measured Through a Capacity Voltage Divider Connected from Top Cap of V113 to Ground)

Figure 58—Cathode of Damper (Pin 3 of V115) (6AX4GT) (3000 Volts PP)



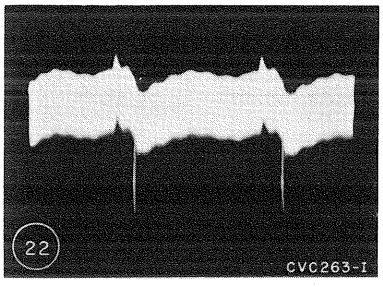
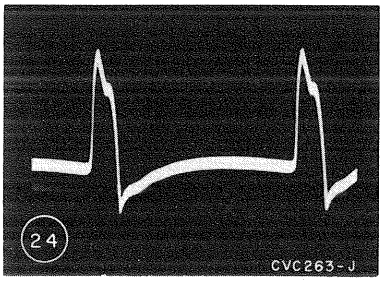


Figure 59—Plate of Damper (Pin 5 of V115) (6AX4GT) (8 Volts PP)

Figure 60—Plate of AGC Amplifier (Pin 6 of V107B) (6U8) (325 Volts PP)



VOLTAGE CHART

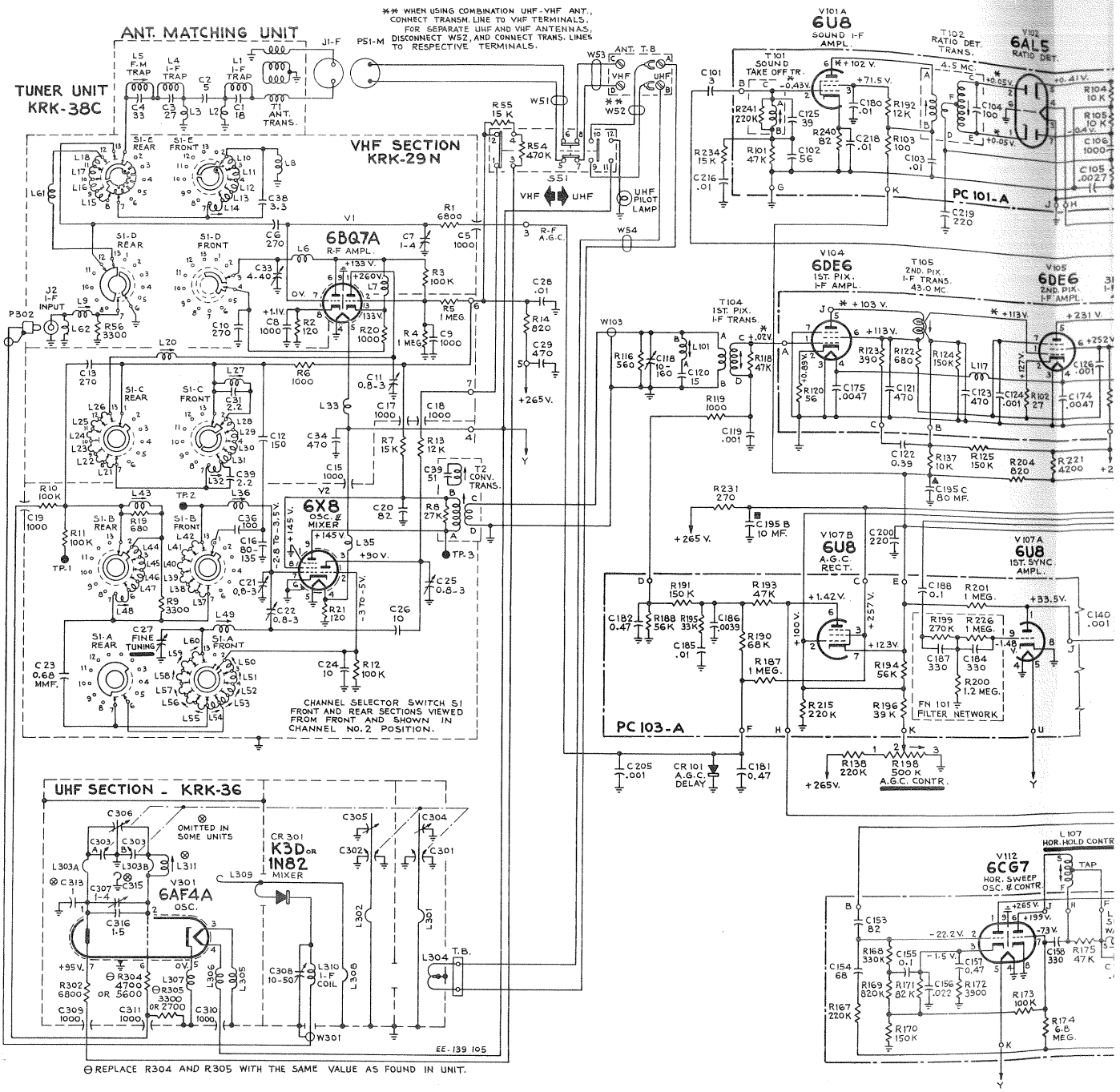
The following measurements represent two sets of conditions. In the first condition, a 30,000 microvolt test pattern signal was fed into the receiver, the picture synchronized and the AGC control properly adjusted. The second condition was obtained by removing the antenna leads and short circuiting the receiver antenna terminals. 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			
V1 (V2) KRK38B or KRK38C	6X8	Mixer	30,000 Mu. V. Signal	9	160	8	160	6	0	7	−2.4 to −3.0	—	—	
			No Signal	9	145	8	145	6	0	7	−2.8 to −3.5	—	—	
		R-F Oscillator	30,000 Mu. V. Signal	3	95	—	—	6	0	2	−3.8 to −5.5	—	—	
			No Signal	3	90	—	—	6	0	2	−3.0 to −5.1	—	—	
V2 (V1) KRK38B or KRK38C	6BQ7A	R-F Amplifier	30,000 Mu. V. Signal	6	170	—	—	8	0.1	7		—	—	
			No Signal	6	133	—	—	8	1.1	7	0	—	—	
		R-F Amplifier	30,000 Mu. V. Signal	1	270	—	—	3	170	2	—	—	—	
			No Signal	1	260	—	—	3	133	2	—	—	—	
V101A	6U8	Sound I-F Amp.	30,000 Mu. V. Signal	6	*110	3	78	7	0	2	*−0.6	8.11	3.59	*Measured with 1 Megohm, ½ watt resistor in series with probe
			No Signal	6	*102	3	71.5	7	0	2	*−0.43	7.75	3.45	
V101B	6U8	1st Audio Amp.	30,000 Mu. V. Signal	1	25.2	—	—	8	0	9	−0.88	0.56	—	
			No Signal	1	24.9	—	—	8	0	9	−0.85	0.55	—	
V102	6AL5	Ratio Detector	30,000 Mu. V. Signal	2 7	*−0.75 −3.7	— —	— —	5 1	4.25 −0.75	— —	— —	0.29 0.29	— —	*Measured with 1 Megohm, ½ watt resistor in series with probe
			No Signal	2 7	*0.05 −0.40	— —	— —	5 1	0.41 *0.05	— —	— —	0.03 0.03	— —	
V103	6AQ5	Audio Output	30,000 Mu. V. Signal	5	190	6	198	2	11	1	0	21.6	1.57	At min. volume
			No Signal	5	187	6	193	2	10.9	1	0	21.0	1.55	
V104	6DE6	1st Px. I-F Amplifier	30,000 Mu. V. Signal	5	*128	6	140	2	0.05	1	*−5.45	0.67	0.21	*Measured with 1 Megohm, ½ watt resistor in series with probe
			No Signal	5	*103	6	113	2	0.89	1	*0.02	11.6	3.4	
V105	6DE6	2nd Pix. I-F Amplifier	30,000 Mu. V. Signal	5	*249	6	271	2	150	1	*132	0.52	0.14	
			No Signal	5	*231	6	252	2	127	1	*113	11.9	3.05	
V106A	6AS8	3rd Pix. I-F Amplifier	30,000 Mu. V. Signal	9	*131	1	142	3	1.82	2	*0	7.67	2.33	
			No Signal	9	*127	1	137	3	1.72	2	*0	7.18	2.22	
V106B	6AS8	2nd Det.	30,000 Mu. V. Signal	6	−1.19	—	—	8	*0.48	—	—	0.38	—	
			No Signal	6	−0.12	—	—	8	*0.47	—	—	0.03	—	
V107A	6U8	1st Sync. Amp.	30,000 Mu. V. Signal	1	35	—	—	8	0	9	−10.8	0.11	—	
			No Signal	1	33.5	—	—	8	0	9	−1.48	0.11	—	

VOLTAGE CHART

Tube No.	Tube Type	Function	Operating Condition	E. Plate Pin No.	E. Plate Volts	E. Screen Pin No.	E. Screen Volts	E. Cathode Pin No.	E. Cathode Volts	E. Grid Pin No.	E. Grid Volts	I Plate (ma.)	I Screen (ma.)	Notes on Measurements
V107B	6U8	AGC Rectifier	30,000 Mu. V. Signal	6	–38.4	3	262	7	133	2	120	0.37	—	AGC control set for normal operation
			No Signal	6	1.42	3	257	7	122	2	100	0	0.24	
V108A	6AW8	1st Video Amp.	30,000 Mu. V. Signal	9	168	8	133	6	1.66	7	–1.21	6.08	0	
			No Signal	9	132	8	123	6	2.18	7	–0.11	8.90	1.42	
V108B	6AW8	Noise Cancellation	30,000 Mu. V. Signal	3	198	—	—	1	–0.68	2	–10.0	0	2.10	
			No Signal	3	194	—	—	1	–0.07	2	–10.0	0	—	
V109	6AQ5	Video Output	30,000 Mu. V. Signal	5	177	6	262	2	16.8	1-7	0.01	22.1	—	At maximum contrast
			No Signal	5	171	6	257	2	16.1	1-7	–0.01	21.6	3.44	
V110A	6CG7	Sync. Output	30,000 Mu. V. Signal	1	65.5	—	—	3	0	2	–1.46	7.75	2.89	
			No Signal	1	59.5	—	—	3	0	2	0.10	7.30	—	
V110B	6CG7	Vert. Osc. & Discharge	30,000 Mu. V. Signal	6	140	—	—	8	0	7	–42.2	.27	—	
			No Signal	6	142	—	—	8	0	7	–40.9	.26	—	
V111	6AQ5	Vertical Output	30,000 Mu. V. Signal	5	262	6	272	2	0	1	–25.5	21.9	3.82	
			No Signal	5	256	6	267	2	0	1	–24.9	21.9	3.9	
V112	6CG7	Horizontal Osc. Control	30,000 Mu. V. Signal	1	272	—	—	3	2.75	2	–23.3	0.33	—	
			No Signal	1	265	—	—	3	–1.50	2	–22.2	0.32	—	
		Horizontal Oscillator	30,000 Mu. V. Signal	6	206	—	—	8	0	7	–73.0	2.9	—	
			No Signal	6	199	—	—	8	0	7	–73.0	2.62	—	
V113	6BQ6 GTB	Horizontal Output	30,000 Mu. V. Signal	Cap	†137	4	189	8	12.2	5	–22.5	98.3	11.7	†High Voltage Pulse Present (40 Megs. in series with VTVM)
			No Signal	Cap	†135	4	182	8	11.9	5	–22.0	94.5	11.5	
V114	1B3GT	H. V. Rectifier	30,000 Mu. V. Signal	Cap	†	—	—	2 & 7	17,000	—	—	0.10	—	†High Voltage Pulse Present
			No Signal	Cap	†	—	—	2 & 7	16,600	—	—	0.05	—	
V115	6AX4GT	Damper	30,000 Mu. V. Signal	5	272	—	—	3	†132	—	—	100	—	†High Voltage Pulse Present (40 Megs. in series with VTVM)
			No Signal	5	265	—	—	3	†130	—	—	91	—	
V116	21AMP4A	Kinescope	30,000 Mu. V. Signal	Cone	17,000	10	445	11	59	2	2.8	0.10	0	At average Brightness
			No Signal	Cone	16,600	10	437	11	48	2	2.8	0.05	0	
V117	5U4GB or 5AS4	Rectifier	30,000 Mu. V. Signal	4 & 6	—	—	—	2 & 8	282	—	—	250	—	
			No Signal	4 & 6	—	—	—	2 & 8	276	—	—	266	—	

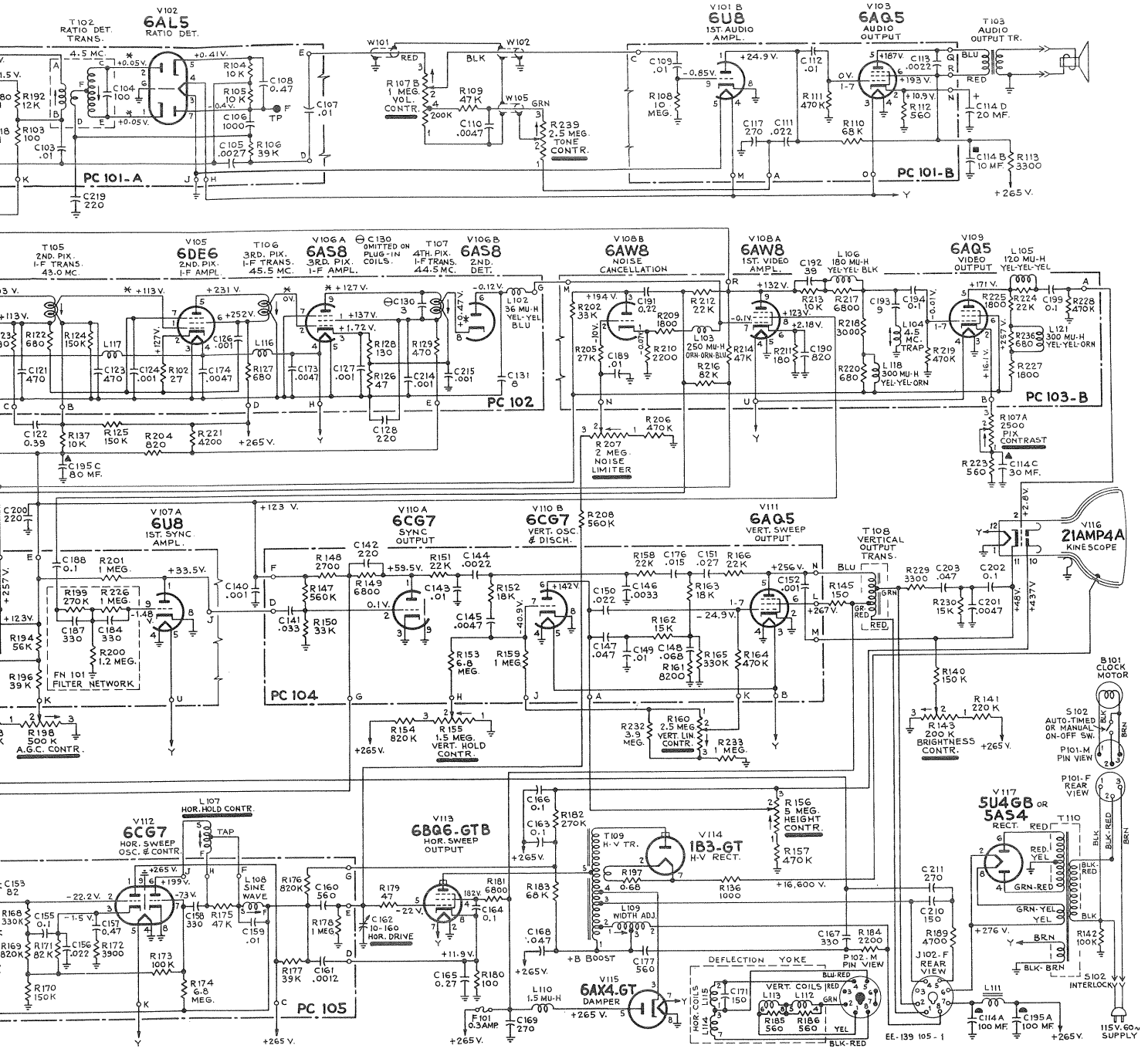
CUT ALONG THIS LINE



HIGH VOLTAGE WARNING

OPERATION OF THESE RECEIVERS OUTSIDE THE CABINET OR WITH THE COVERS REMOVED, INVOLV
HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THE RECEIVER SHOULD NOT BE ATTEMP
ONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY WHEN WORKIN
VOLTAGE EQUIPMENT. DO NOT OPERATE THE RECEIVER WITH THE HIGH VOLTAGE COMPARTM
REMOVED. MAKE SURE THAT THE GROUND STRAP BETWEEN THE CHASSIS SHIELD PLATE AND THE
AND THE STRAP BETWEEN THE FRONT TRIM AND THE TUNER BRACKET ARE SECURELY FASTENED
CONTACT BEFORE TURNING THE RECEIVER ON.

SSIS CIRCUIT SCHEMATIC DIAGRAM KCS101A



PRODUCTION CHANGES IN KCS101 & KCS101A CHASSIS

In some receivers C219, at T102-D, was omitted.
In some receivers R241, at T101, was omitted.

G

VERS REMOVED, INVOLVES A SHOCK SHOULD NOT BE ATTEMPTED BY ANY- CESSARY WHEN WORKING ON HIGH H VOLTAGE COMPARTMENT SHIELD SHIELD PLATE AND THE FRONT TRIM E SECURELY FASTENED AND MAKING

The schematic is shown in the latest condition at the time of printing.

All resistance value in ohms. K = 1000.

All capacitance values less than 1 in MF and above 1 in MMF unless otherwise noted.

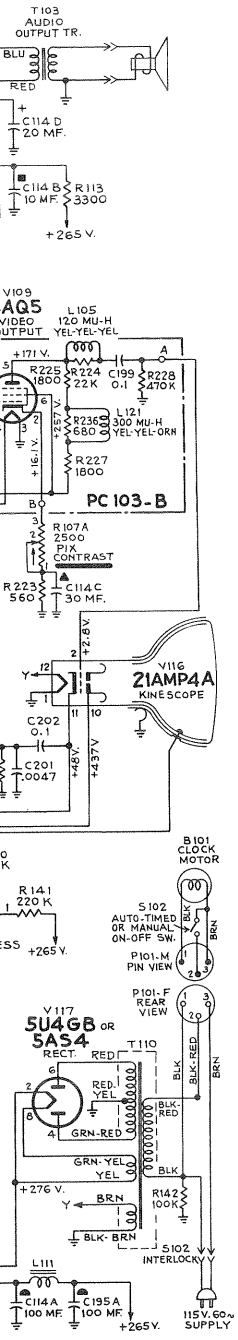
All voltages measured with "VoltOhmyst" Ⓡ and with no signal input. Voltages should hold within ±20% with 117 v. a-c supply.

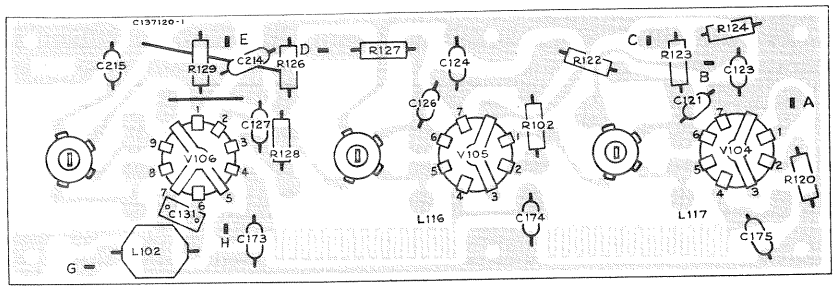
Direction of arrows at controls indicates clockwise rotation.

FIELD SERVICE DATA SHEET

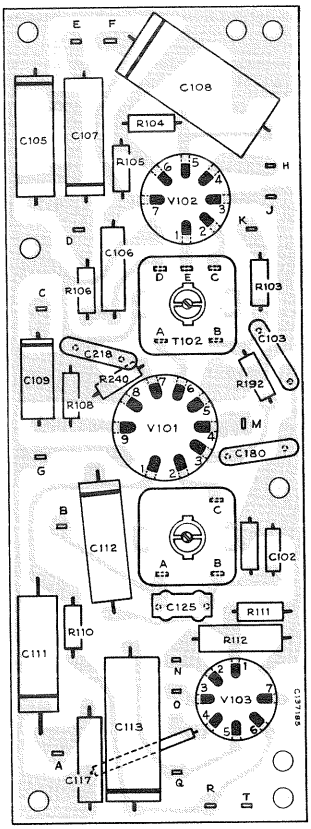
PRINTED CIRCUIT ASSEMBLIES

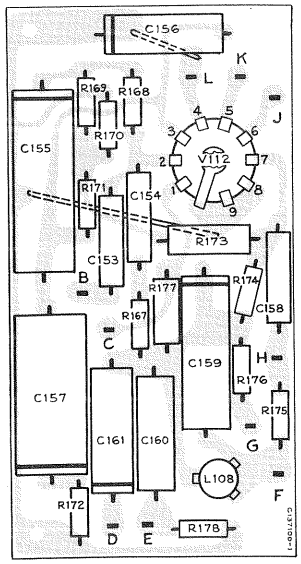
KCS101, A



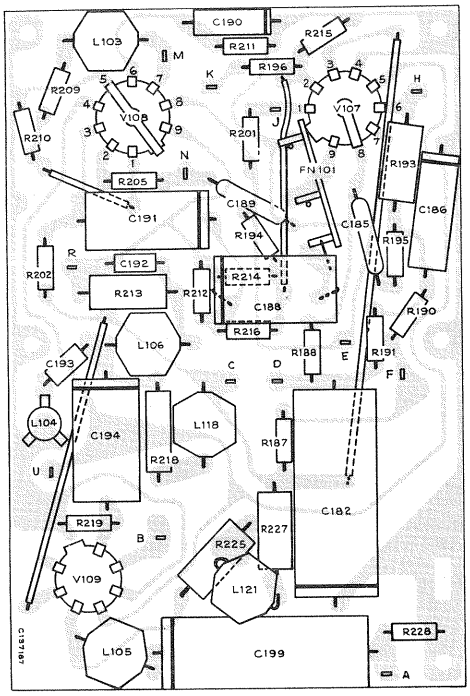


PC102—PICTURE I-F
UNIT LAYOUT
(See Note below)





PC105—HORIZONTAL
OSCILLATOR UNIT LAYOUT



PC-103—VIDEO & 1ST SYNC
UNIT LAYOUT

PC-101—SOUND I-F & AUDIO
UNIT LAYOUT

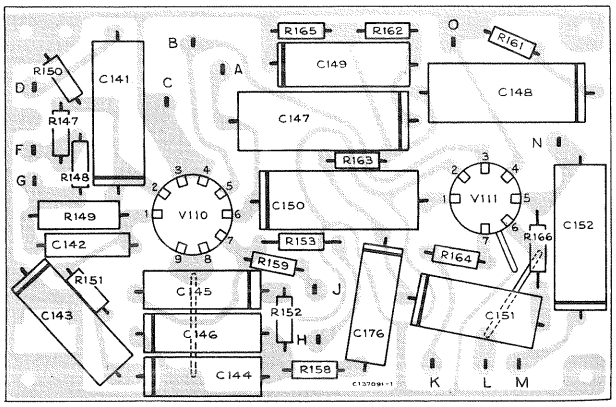
The assemblies represented above are viewed from the component side of the boards and are oriented as they will usually be viewed on the chassis.

The printed writing, on the reverse side of the boards, is presented in "phantom" views super-imposed on the component layouts. This will enable circuit tracing without removing the assemblies from the chassis to see the printed wiring on the reverse side.

Component replacement, when necessary, should be made following the techniques outlined in Printed Circuit Board Service Data 1955 No. T13 dated 11/15/55.

SPECIAL NOTE: Some receivers employ PC102 picture I.F. boards with printed coils for T105, T106 & T107 (for replacement use 76433 coil with 47,000 ohm resistor 502347 across plate and screen when used as T106).

Some receivers employ PC102 picture I.F. boards with plug-in coils for T105, T106 & T107 (for replacement use 101588 coil).



PC-104—VERTICAL & SYNC OUTPUT
UNIT LAYOUT

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

RADIO CORPORATION OF AMERICA
RCA VICTOR TELEVISION DIVISION

Second Edition—First Printing 2-25-57

Tmks. ® Reg. U. S. Pat. Off.

Printed in U. S. A.

FIELD SERVICE DATA SHEET

INSTALLATION CHECK LIST

Connect the antenna transmission line to the receiver antenna terminals. (Refer to schematic diagrams for correct input connections.)

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

1. Check position of ion trap magnet and readjust for maximum raster brightness if necessary.

2. Check raster for proper framing (tilt) in mask. Adjust yoke position by rotating.

3. Check AGC and Noise Limiter control settings. Adjustment should be made as outlined in separate section in next column.

*4. Check width and horizontal linearity, readjust width and drive controls as outlined below, if adjustment is necessary.

*5. Check for normal operation of horizontal hold control. Should hold sync for two full turns or more of the control.

6. Check centering of picture. Adjustment is made with the centering lever on the focus magnet.

7. Check height and vertical linearity, reset controls where required for 1¼" overscan.

8. Adjust focus control for maximum overall definition in fine detail areas of the picture.

9. Check RF oscillator adjustment on all channels. Readjust if necessary, starting at the highest frequency channel, proceeding to the lowest. Do not adjust the UHF rf oscillator in the field.

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

*Width Horizontal Drive & Sinewave Adjustments

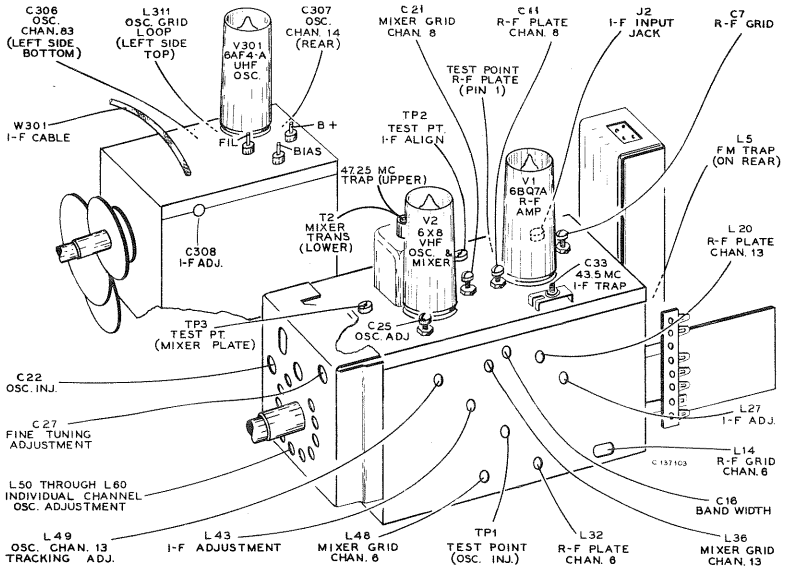
A. Set width coil fully counter-clockwise.

B. Adjust drive for overdrive line then clockwise until line just disappears. If no line appears set fully counter-clockwise.

C. Adjust width for ¾" overscan at each side, with normal line voltage and normal brightness. Repeat Step B.

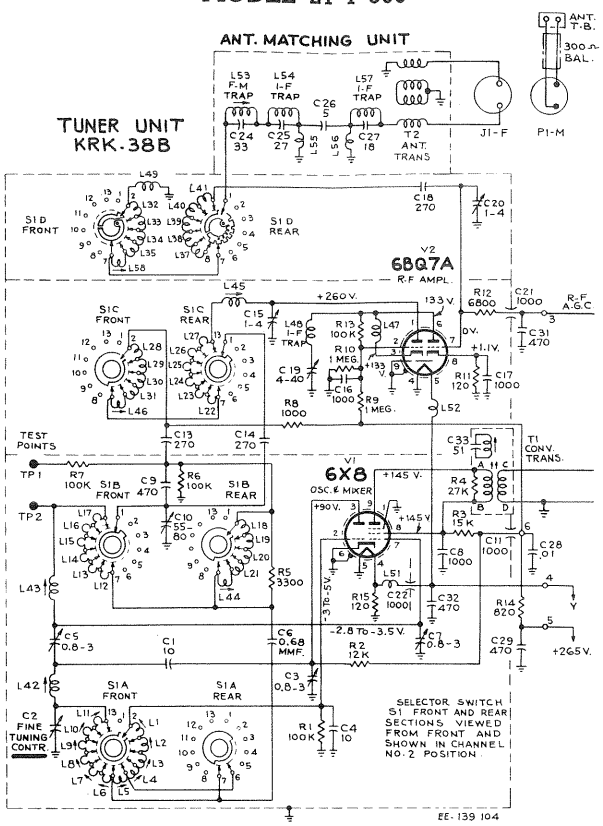
D. Turn horizontal hold control to the left, out of sync., to the point where interrupted oscillation occurs.

E. Adjust sinewave core, as the horizontal hold control is rotated to the left beyond the locked-in position, until 3 to 4 bars occur between the fall out point and interrupted oscillation.



KRK38C (KRK29N/36) UHF/VHF TUNER

TUNER CIRCUIT SCHEMATIC DIAGRAM KCS101 — MODEL 21-T-639



AGC and NOISE LIMITER ADJUSTMENTS.—Careful adjustment of the AGC and Noise Limiter controls is very important for the proper functioning of the receiver.

Turn the Noise Limiter control fully clockwise.

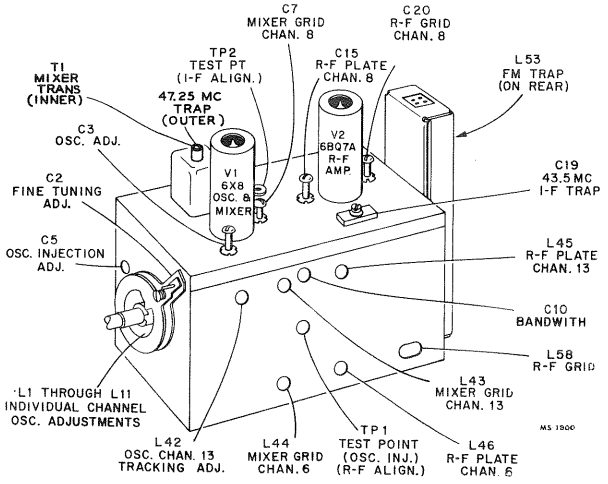
Adjust the AGC control until a bend just occurs in the picture then counter-clockwise 90° from this point.

Set fine tuning for barely perceptible 4.5 mc. beat. Readjust the AGC control for picture bend then counter-clockwise 45°.

Set horizontal hold counter-clockwise as far as possible without making sync unstable.

Turn Noise Limiter control counter-clockwise until horizontal shift or bend just occurs then clockwise 30° from this point.

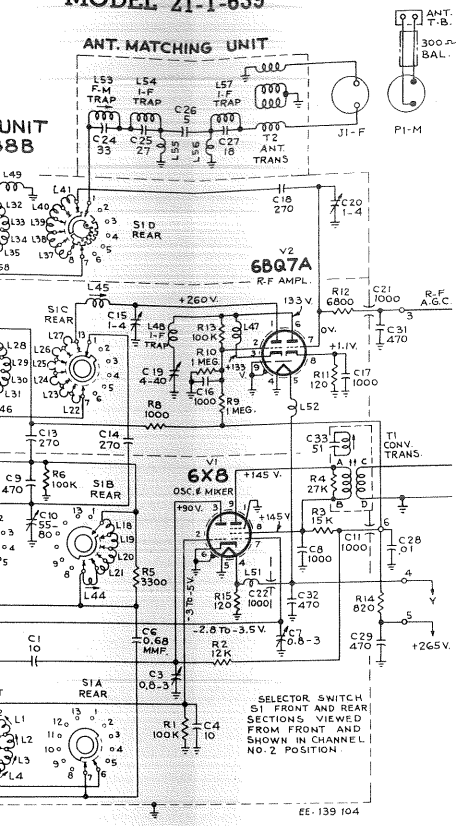
Reset horizontal hold to center of holding range.



KRK38B (KRK22H) VHF TUNER

FIELD SERVICE DATA SHEET

CUIT SCHEMATIC DIAGRAM KCS101 — MODEL 21-T-639



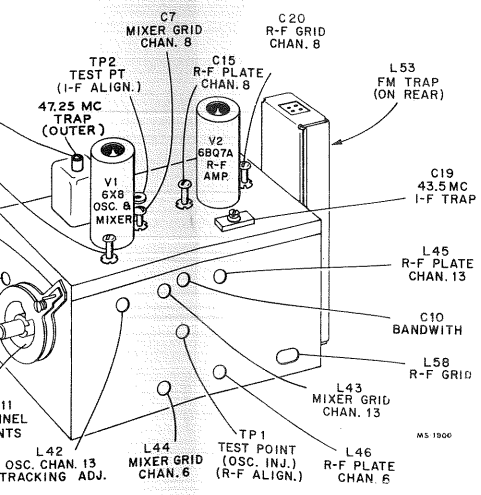
NOISE LIMITER ADJUSTMENTS.—Careful ad- the AGC and Noise Limiter controls is very im- he proper functioning of the receiver.

Noise Limiter control fully clockwise.

AGC control until a bend just occurs in the pic- unter-clockwise 90° from this point.

ning for barely perceptible 4.5 mc. beat. Readjust ntrol for picture bend then counter-clockwise 45°. ntal hold counter-clockwise as far as possible ing sync unstable.

e Limiter control counter-clockwise until horizon- end just occurs then clockwise 30° from this point. zontal hold to center of holding range.



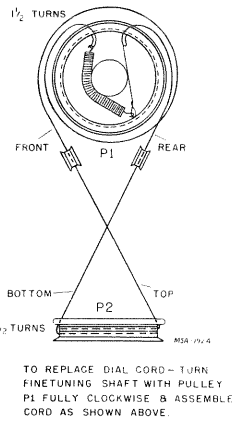
KRK38B (KRK22H) VHF TUNER

KINESCOPE AND SAFETY GLASS CLEANING.—Remove the rear panel of the receiver. There are a number of flat springs holding the front metal trim of the cabinet to the cabinet front.

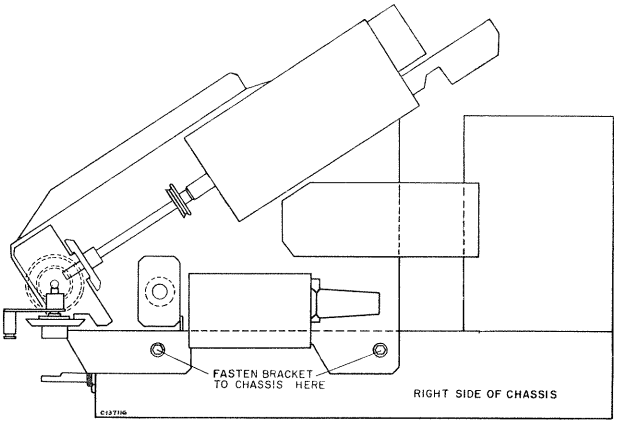
Reach in from the rear of the receiver and press in on each spring at the open end. Slide the spring out of the slot provided.

Remove the metal trim and the safety glass.

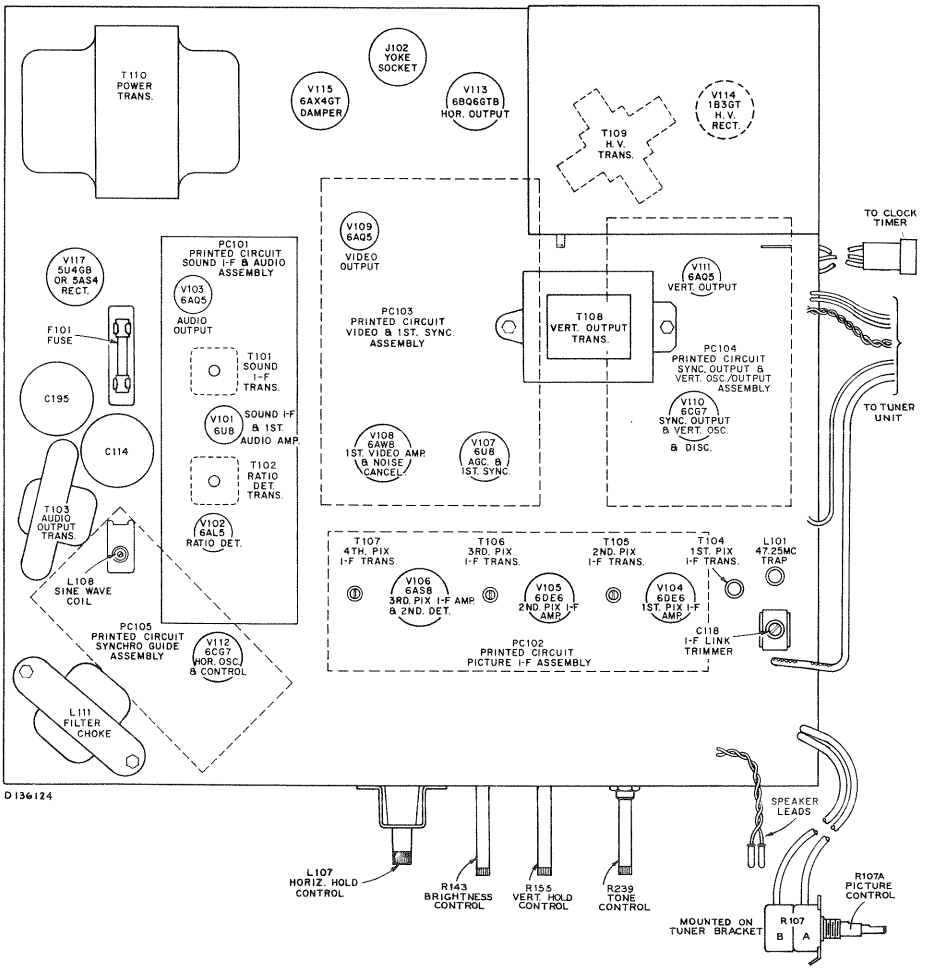
The kinescope faceplate and the safety glass should be cleaned only with a soft cloth and "Windex" or similar cleaning agent.



DIAL CORD



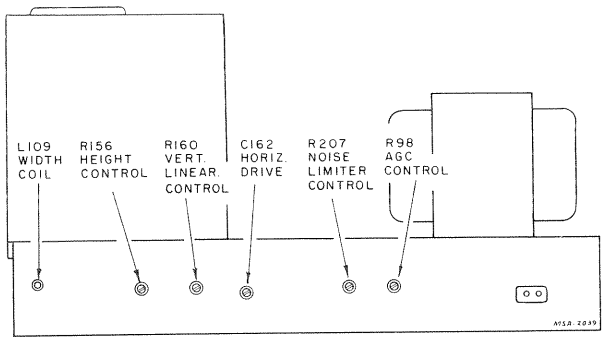
TUNER BRACKET FASTENED TO CHASSIS



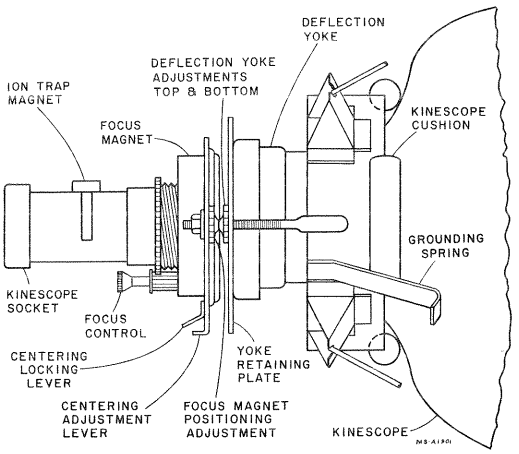
CHASSIS TOP VIEW

21-T-639
21-T-639U

FIELD SERVICE DATA SHEET



REAR CHASSIS ADJUSTMENTS



YOKE AND FOCUS MAGNET

REPLACEMENT PARTS (PARTIAL LISTING)

SYMBOL NO.	STOCK NO.	DESCRIPTION
C101	76507	Capacitor—Fixed, ceramic, 3 mmf., 500 v.
C102	79324	Capacitor—Fixed, ceramic, 56 mmf., 500 v.
C103	73960	Capacitor—Fixed, ceramic, .01 mf., 500 v.
C106	39652	Capacitor—Fixed, mica, 1000 mmf., 500 v.
C117	39638	Capacitor—Fixed, mica, 270 mmf., 500 v.
C119	77252	Capacitor—Fixed, ceramic, .001 mf., 500 v.
C120	39044	Capacitor—Fixed, ceramic, 15 mmf., 500 v.
C121	78622	Capacitor—Fixed, ceramic, 470 mmf., 500 v.
C123	77293	Capacitor—Fixed, ceramic, 470 mmf., 500 v. DC
C124	77252	Capacitor—Fixed, ceramic, .001 mf., 500 v. DC
C125	100350	Capacitor—Fixed, ceramic, 39 mmf., 500 v.
C126	78623	Capacitor—Fixed, ceramic, .001 mf., 500 v.
C127	77293	Same as C123
C128	100672	Capacitor—Fixed, ceramic, 220 mmf., 500 v.
C131	101439	Capacitor—Fixed, ceramic, 8 mmf., 500 v.
C140	77252	Same as C119
C142	39636	Capacitor—Fixed, mica, 220 mmf., 500 v.
C153	76474	Capacitor—Fixed, mica, 82 mmf., 1000 v.
C154	76475	Capacitor—Fixed, mica, 68 mmf., 1000 v.
C158	76476	Capacitor—Fixed, mica, 330 mmf., 1000 v.
C160	74250	Capacitor—Fixed, mica, 560 mmf., 1000 v.
C167	101295	Capacitor—Fixed, ceramic, 330 mmf., 1500 v.
C169	76579	Capacitor—Fixed, mica, 270 mmf., 1000 v.
C173 to C175 Incl.	73473	Capacitor—Fixed, ceramic, .0047 mf., 500 v.
C177	74250	Capacitor—Fixed, mica, 560 mmf., 1000 v.
C180	73960	Same as C103
C184	39640	Capacitor—Fixed, ceramic, 330 mmf. 500 v.
C185	73960	Capacitor—Fixed, ceramic, .01 mf., 500 v.
C187	39640	Same as C184
C189	73960	Same as C185
C190	78143	Capacitor—Fixed, mica, 820 mmf., 300 v.
C192	73664	Capacitor—Fixed, ceramic, 39 mmf., 500 v.
C193	77108	Capacitor—Fixed, ceramic, 9 mmf., 500 v.
C200	77625	Capacitor—Fixed, ceramic, 220 mmf., 500 v.
C205	77252	Capacitor—Fixed, ceramic, .001 mf., 500 v. For KCS101-A only
C210	100453	Capacitor—Fixed, ceramic, 150 mmf., 2500 v.
C211	100104	Capacitor—Fixed, ceramic, 270 mmf., 500 v.
C214	78623	Same as C126
C215	77293	Same as C123
C216	73960	Capacitor—Fixed, ceramic, .01 mf., 500 v.
CR101	100844	Crystal—AGC
F101	78214	Fuse—.3 amp.
R107A, B	101794	Control—"On-Off" volume and picture control
R113	77670	Resistor—Fixed, w.w., 3300 ohms, ±10%, 7 w., ceramic insulated.
R143	101795	Control—Brightness control
R155	101796	Control—Vertical hold control
R156	100290	Control—Height control
R160	100864	Control—Vertical linearity control
R197	100845	Resistor—Fixed, wire wound, .68 ohms, ±5%, 1/3 w.
R198	100862	Control—AGC control
R207	100863	Control—Syncroguide stabilizer
R221	100846	Resistor—Fixed, wire wound, 4200 ohms, ±10%, 7 w.
T108	100867	Transformer—Vertical output transformer
T109	100860	Transformer—Hi-voltage transformer
	71457	Cord—Power cord and plug
	101148	Dial—UHF dial—dark wine—for mahogany grain instruments for Model 21T639U
	101149	Dial—UHF dial—taupe—for limed oak instruments for Model 21T639U
	101813	Escutcheon—Timer dial escutcheon
	101124	Knob—Contrast control—gold
	101138	Knob—Volume—dark wine—for mahogany grain instruments
	100621	Knob—Volume—taupe—for limed oak instruments
	101811	Knob—Timer hand knob (Time set)
	101810	Knob—Timer switch knob and set knob—clear polystyrene (Start time or view time)
	100946	Knob—UHF channel selector—dark wine—for mahogany grain instruments for Model 21T639U
	100947	Knob—UHF channel selector—taupe—for oak grain instruments for Model 21T639U
	101806	Knob—UHF tuning—dark wine—for mahogany grain instruments for Model 21T639U
	101807	Knob—UHF tuning—taupe—for oak grain instruments for Model 21T639U
	100944	Knob—VHF channel selector—wine—for mahogany grain instruments for Model 21T639
	100945	Knob—VHF channel selector—taupe—for oak grain instruments for Model 21T639
	101276	Knob—VHF and UHF fine tuning control knob—gold
	11891	Lamp—Channel indicator lamp for Model 21T639U only
	101129	Magnet—Centering magnet
	76141	Magnet—Ion trap magnet
	101147	Yoke—Deflection yoke assembly complete with connector Includes C171, L112, L113, L114, L115, P102, R185, R186

SERVICE SUGGESTIONS

Following is a list of symptoms of possible failures and an indication of some of the possible faults:

NO RASTER ON KINESCOPE:

(1) Incorrect adjustment of ion trap magnet. Magnet reversed either front to back or top to bottom.
(2) V112 or V113 inoperative. Check waveforms on grids and plates.
(3) No high voltage—if horizontal deflection is operating as evidenced by the correct waveform on terminal 5 of high voltage transformer, the trouble can be isolated to the 1B3 circuit. Either the T109 high voltage winding is open, the 1B3 tube is defective or its filament circuit is open.
(4) C204 leaky.
(5) Damper tube (V115) inoperative.
(6) Defective kinescope.
(7) R136 open.
(8) No receiver plate voltage—filter capacitor shorted—or filter choke open.
(9) F101 fuse open.

NO VERTICAL DEFLECTION:

(1) V110 or V111 inoperative. Check voltage and waveforms on grids and plates.
(2) T108 open.
(3) Vertical deflection coils open.

SMALL RASTER:

(1) Low Plus B or low line voltage.
(2) V113 defective.

POOR VERTICAL LINEARITY:

(1) If adjustments cannot correct, change V111.
(2) Vertical output transformer T108 defective.
(3) V110B defective—check voltage and waveforms on grid and plate.
(4) C146, C147, C148, C150 or C176 defective.
(5) Low plate voltage—check rectifiers and capacitors in supply circuits.
(6) If height is insufficient, try changing V110.

POOR HORIZONTAL LINEARITY:

(1) If adjustments do not correct, change V113, or V115.
(2) T109 defective.
(3) C168 or C169 defective.

WRINKLES ON SIDE OF RASTER:

(1) C171 defective.
(2) Defective yoke.

PICTURE OUT OF SYNC HORIZONTALLY:

(1) L107 incorrectly tuned.
(2) L108 or C159 defective.

TRAPEZOIDAL OR NON SYMMETRICAL RASTER:

(1) Improper adjustment of centering of focus magnet or ion trap magnet.
(2) Defective yoke.

RASTER AND SIGNAL ON KINESCOPE BUT NO SOUND:

(1) T101 defective.
(2) Sound i-f, ratio detector or audio amplifier inoperative—check V101, V102, V103 and their socket voltages.
(3) Audio system defective.
(4) Speaker defective.

SIGNAL AT KINESCOPE GRID BUT NO SYNC:

(1) AGC control R198 misadjusted.
(2) V108 defective. Check voltage and waveforms at its grid and plate.
(3) C189 shorted.

SIGNAL ON KINESCOPE GRID BUT NO VERTICAL SYNC:

(1) Check V110B and associated circuit.
(2) Integrating network inoperative—Check.
(3) R153 high in value.
(4) V110 defective.
(5) Check Noise Limiter and AGC controls.

SIGNAL ON KINESCOPE GRID BUT NO HORIZONTAL SYNC:

(1) L107 misadjusted—readjust as instructed on page 4.
(2) V112 or V113 inoperative—check socket voltages and waveforms.
(3) L107 defective.
(4) C153, C155, C156, C157, C158 or C159 defective.
(5) If horizontal speed is completely off and cannot be adjusted check R173, R175 and R177

SOUND AND RASTER BUT NO PICTURE OR SYNC:

(1) Picture, detector or video amplifier defective—check socket voltages.
(2) Bad contact to kinescope cathode.

PICTURE STABLE BUT POOR RESOLUTION:

(1) V108A defective.
(2) Peaking coils defective—check resistance.
(3) R-F and I-F circuits misaligned.

PICTURE SMEAR:

(1) R-F or I-F circuits misaligned.
(2) Open peaking coil.
(3) This trouble can originate at the transmitter—check on another station.

PICTURE JITTER:

(1) AGC control R198 misadjusted.
(2) If regular sections at the left picture are displaced change V113.

PRINTED CIRCUIT ASSEMBLIES

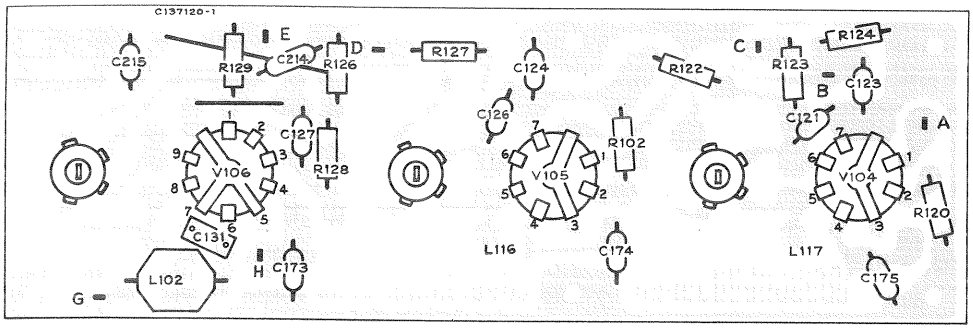


Figure 61—PC102 Picture I-F Assembly Layout

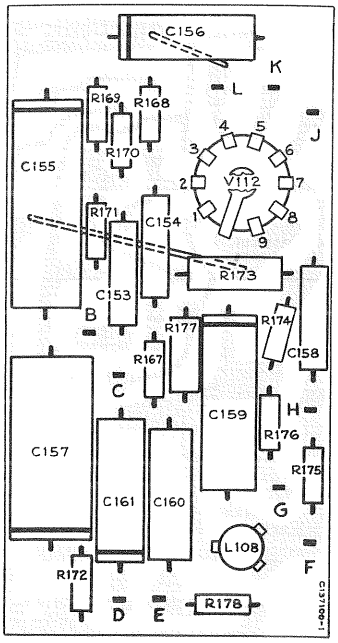


Figure 62—PC105 Horizontal Oscillator Assembly Layout

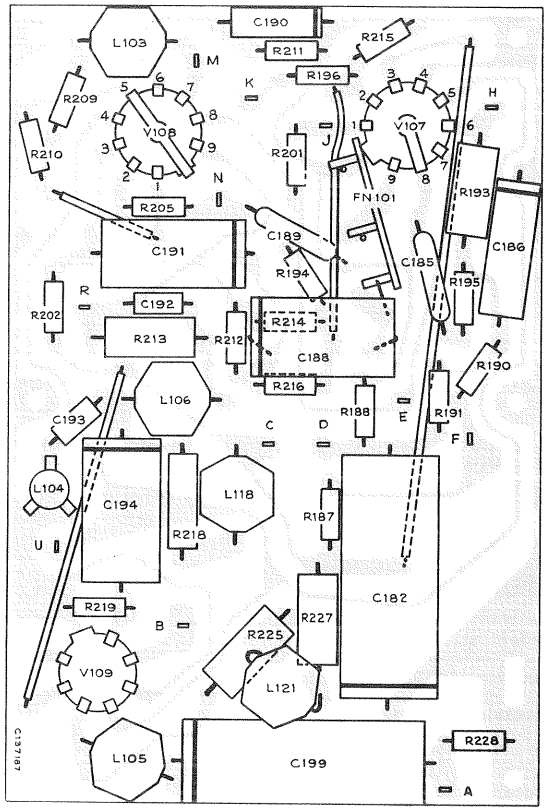


Figure 63—PC103 Video and 1st Sync Assembly Layout

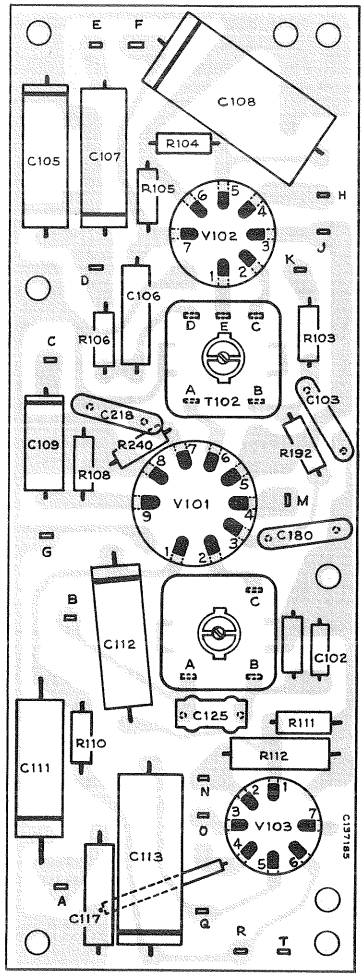


Figure 64—PC101 Sound I-F and Audio Assembly Layout

The assemblies represented above are viewed from the component side of the boards and are oriented as they will usually be viewed on the chassis.

The printed writing, on the reverse side of the boards, is presented in "phantom" views super-imposed on the component layouts. This will enable circuit tracing without removing the assemblies from the chassis to see the printed wiring on the reverse side.

Component replacement, when necessary, should be made following the techniques outlined in Printed Circuit Board Service Data 1955 No. T13 dated 11/15/55.

SPECIAL NOTE: Some receivers employ PC102 picture I.F. boards with printed coils for T105, T106 & T107 (for replacement use 76433 coil with 47,000 ohm resistor 502347 across plate and screen when used as T106).

Some receivers employ PC102 picture I.F. boards with plug-in coils for T105, T106 & T107 (for replacement use 101588 coil).

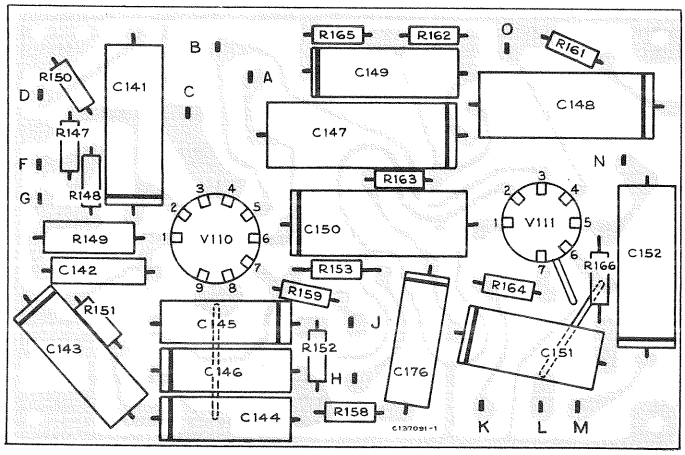
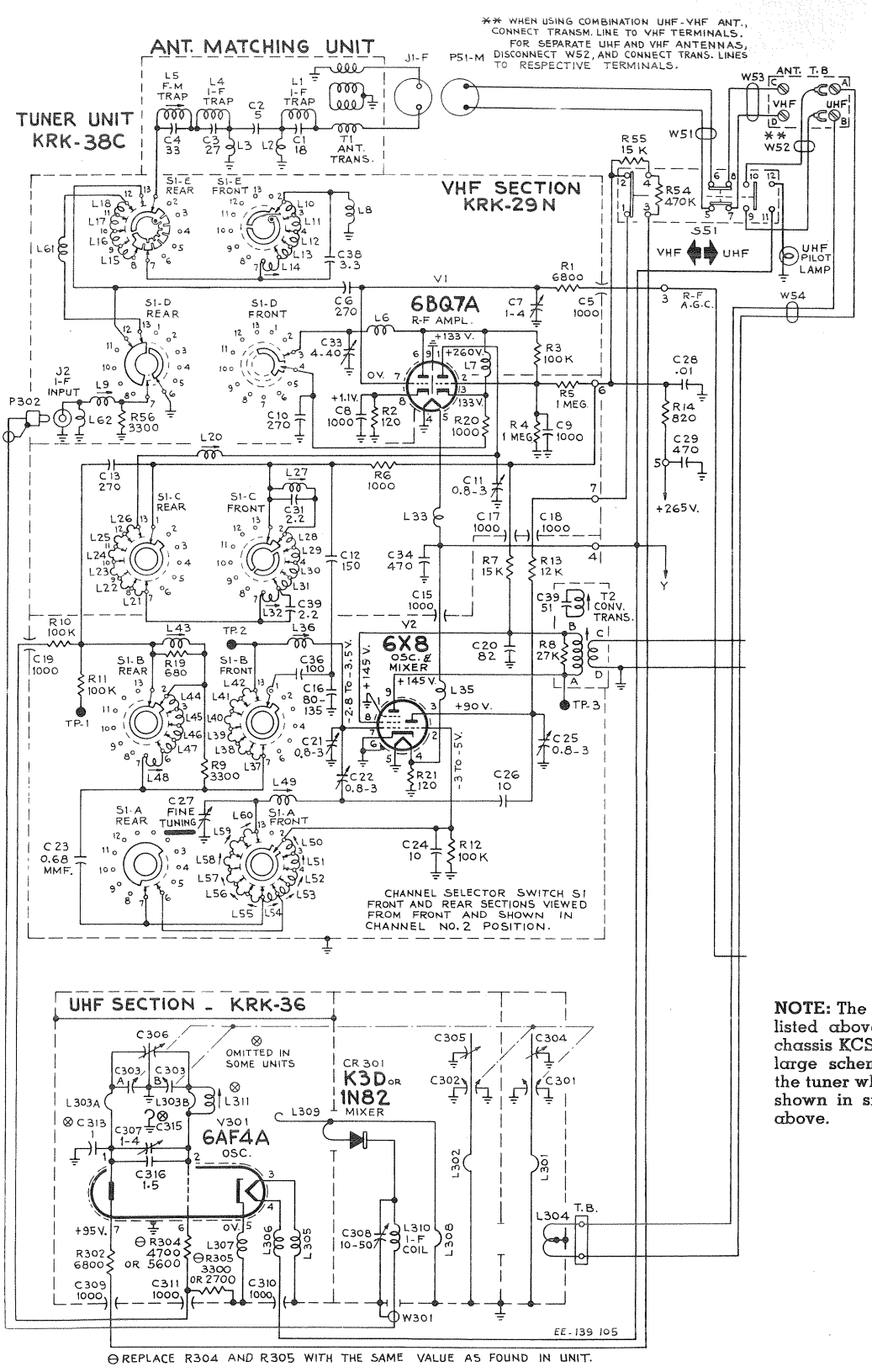


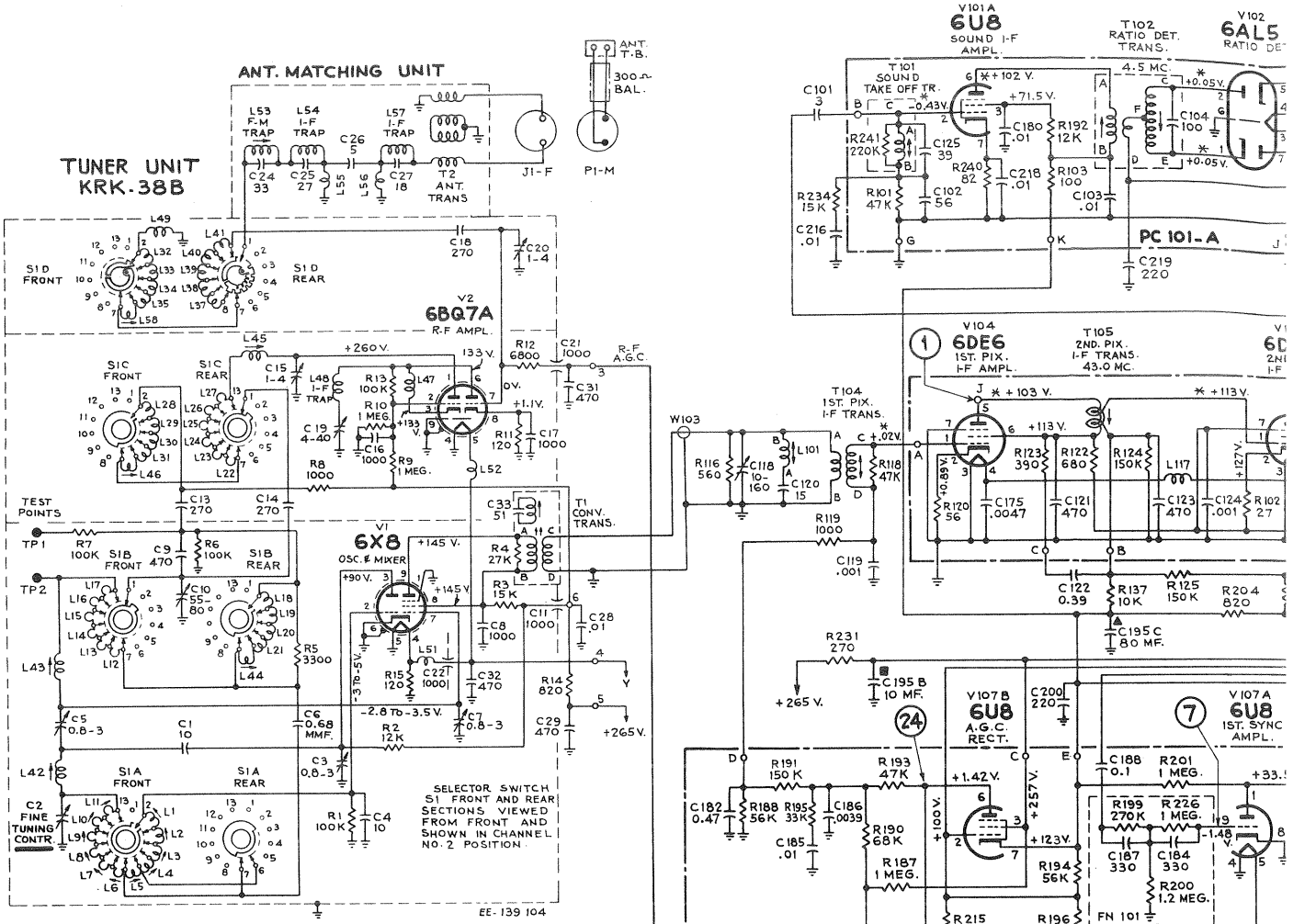
Figure 65—PC104 Vertical and Sync Output Assembly Layout

TUNER CIRCUIT SCHEMATIC DIAGRAM KCS101A

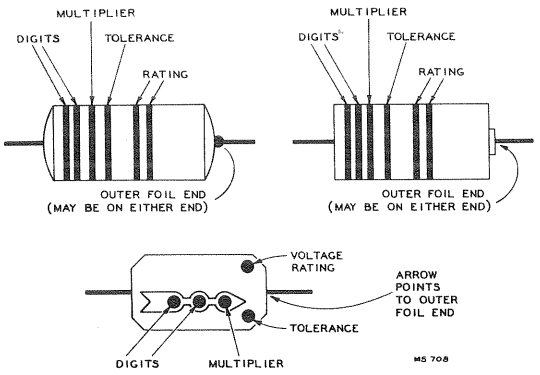


NOTE: The KCS101A chassis listed above is identical to chassis KCS101 shown in the large schematic, except for the tuner which is a KRK38C, shown in smaller schematic above.

Figure 66—Tuner Circuit Schematic Diagram for KCS101A Chassis for Model 21-T-639U



COLOR CODES, MOULDED PAPER CAPACITORS



PRODUCTION CHANGES IN KCS101 & KCS101A CHASSIS

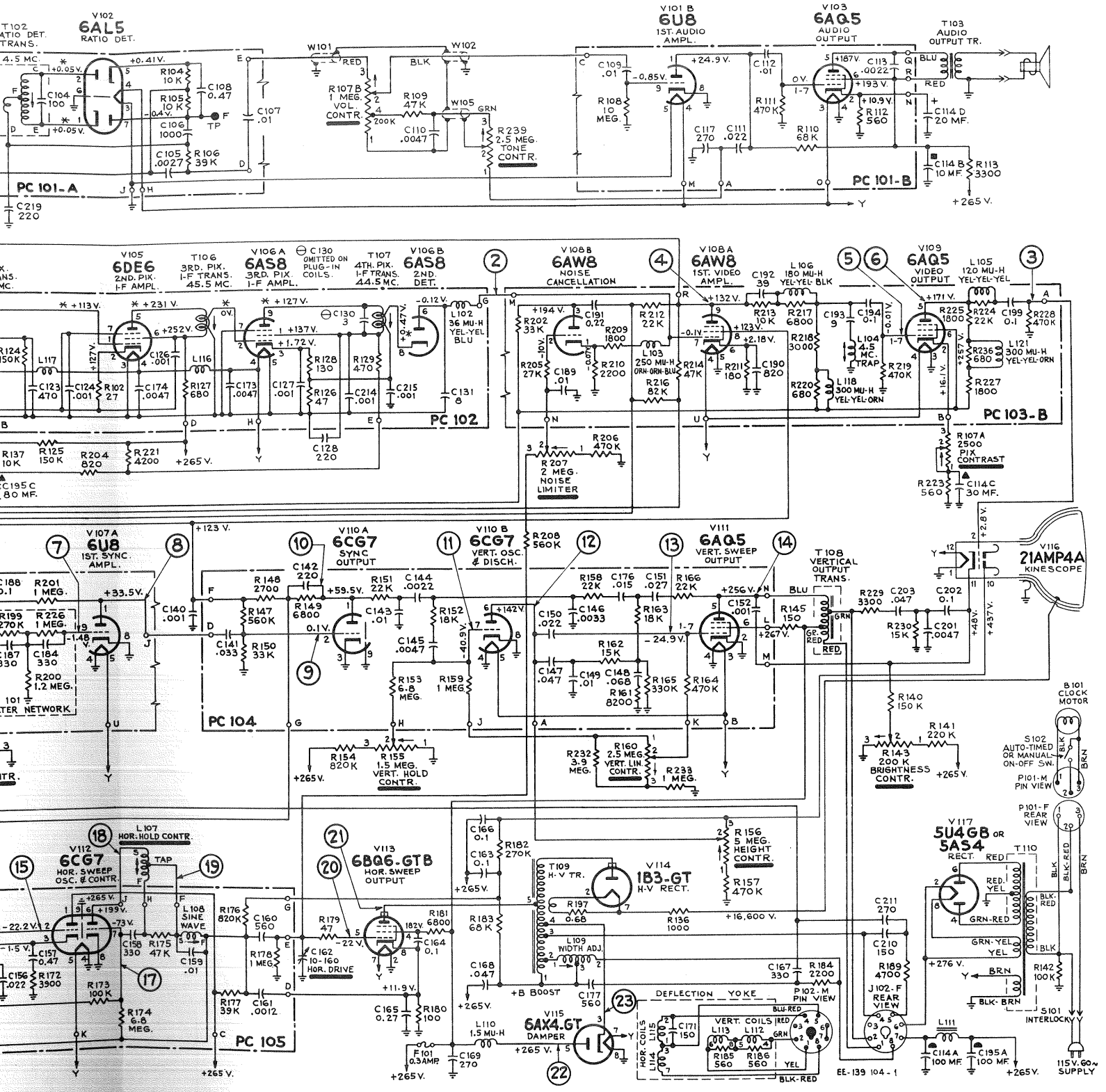
In some receivers C219, at T102-D, was omitted.
In some receivers R241, at T101, was omitted.

Balloons (1)(2) etc., shown on schematic above, indicate points of observation of the waveforms shown on pages 20 to 23.

The schematic is shown in the latest condition at the time of printing.
All resistance value in ohms. K = 1000.

A chassis entical to own in the except for a KRK38C, schematic

IRCUIT SCHEMATIC DIAGRAM KCS101



e latest

=1000.

All capacitance values less than 1 in MF and above 1 in MMF unless otherwise noted.

Direction of arrows at controls indicates clockwise rotation.

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

Figure 67—Chassis Circuit Schematic Diagram KCS101 for Model 21-T-639

REPLACEMENT PARTS

SYMBOL NO.	STOCK NO.	DESCRIPTION
		KRK38B TUNER UNIT ASSEMBLY (Includes KRK22H)
C1	77865	Capacitor—Fixed, ceramic, 10 mmf., ±1.0 mmf., 500 v. DC
C2	79192	Capacitor—Variable ceramic, fine tuning plunger type
C3	77151	Capacitor—Adjustable steatite, 0.8-3.0 mmf.
C4	33098	Capacitor—Fixed, ceramic, 10 mmf., ±1.0 mmf., 500 v. DC
C5	77913	Capacitor—Adjustable, steatite, 0.8-3.0 mmf. (Part of S1)
C6	71504	Capacitor—Fixed, headed-lead, 0.68 mmf., ±20%, 500 v. DC (Part of S2)
C7	77151	Same as C3
C8	77252	Capacitor—Fixed, ceramic, 1000 mmf., +100%, —0%, 500 v. DC
C9	75198	Capacitor—Fixed, ceramic, 470 mmf., ±10%, 500 v. DC (Part of S2)
C10	79551	Capacitor—Adjustable, mica trimmer
C11	77084	Capacitor—Feed-thru, 1000 mmf.
C13	75199	Capacitor—Fixed, ceramic, insulated, 270 mmf., ±20%, 500 v. DC (Part of S2)
C14	75199	Capacitor—Fixed, ceramic, insulated, 270 mmf., ±20%, 500 v. DC (Part of S3)
C15	76532	Capacitor—Adjustable, steatite, 1-4 mmf.
C16, C17	77252	Same as C8
C18	75199	Capacitor—Fixed, ceramic, 270 mmf., ±20%, 500 v. DC
C19	77616	Capacitor—Adjustable mica, 4-40 mmf.
C20	76532	Same as C15
C21, C22	77084	Same as C11
C24 to C27 Incl.		Part of antenna matching transformer T2
C28	73960	Capacitor—Fixed, ceramic, 10,000 mmf., +100%, —10%, 500 v. DC
C29	77293	Capacitor—Fixed, ceramic, 470 mmf., +100%, —0%, 500 v. DC
C31, C32	77293	Same as C29
L1 to L42 Incl.		(Part of S1, S2, S3, S4)
L43	77919	Coil—Channel No. 13 mixer coil (Part of S1, S2, S3, S4)
L44	73874	Coil—Channel No. 6 mixer coil (Part of S1, S2, S3, S4)
L45	77921	Coil—Channel No. 13 RF plate coil (Part of S1, S2, S3, S4)
L46	73460	Coil—Channel No. 6 RF plate coil (Part of S1, S2, S3, S4)
L47	76562	Coil—RF amplifier coupling coil
L48	78466	Coil—RF choke coil
L49	77859	Connector—RF grid switch return connector
L50, L51	79067	Coil—Heater choke coil
L52	77206	Coil—Filament choke coil
L53 to L57 Incl.		Part of antenna matching transformer T2
L58		(Part of S4)
R1	504410	Resistor—Fixed, composition, 100,000 ohms, ±20%, ½w.
R2	523312	Resistor—Fixed, composition, 12,000 ohms, ±10%, 2 w.
R3	523315	Resistor—Fixed, composition, 15,000 ohms, ±10%, 2 w.
R4		(Part of T1)
R5	502233	Resistor—Fixed, composition, 3300 ohms, ±10%, ½ w. (Part of S2)
R6, R7	502410	Resistor—Fixed, composition, 100,000 ohms, ±10%, ½ w. (Part of S2)
R8	502210	Resistor—Fixed, composition, 1000 ohms, ±20%, ½ w. (Part of S3)
R9, R10	503510	Resistor—Fixed, composition, 1.0 megohm, ±10%, ½ w.
R11	503112	Resistor—Fixed, composition, 120 ohms, ±10%, ½ w.
R12	504268	Resistor—Fixed, composition, 6800 ohms, ±20%, ½ w.
R13	504410	Same as R1
R14	503182	Resistor—Fixed, composition, 820 ohms, ±10%, ½ w.
R15	503112	Same as R11
S1A	79068	Stator—Oscillator stator complete with rotor, coils and trimmer (C5, L1 to L11 Incl., L42)
S1B	78800	Stator—Mixer stator complete with rotor, coils, capacitors and resistors (C6, C9, C13, L12 to L21 Incl., L43, L44, R5, R6, R7)
S1C	78801	Stator—RF plate stator complete with rotor, coils, capacitors and resistors (C14, L22 to L31 Incl., L45, L46, R8)
S1D	78802	Stator—RF grid stator complete with rotor and coils (L32 to L41 Incl.)
T1	78399	Transformer—Converter transformer
T2	100454	Transformer—Antenna matching transformer complete (C24, C25, C26, C27, J1, L53, L54, L55, L56, L57)
	100882	Board—Antenna terminal board assembly
	77850	Bracket—Side bracket for mounting coil and stators
	100886	Cam—UHF tuning cam assembly
	77854	Clip—Mounting clip for fine tuning core
	77915	Coil—Channel No. 13 oscillator coil
	77860	Connector—Grounding strap connector
	76460	Contact—Test point contact
	72953	Cord—VHF dial drive cord
	79193	Core—Adjustable core for fine tuning capacitor
	77918	Core—¼-20 ½" adjusting core for L44, L46
	77914	Core—No. 8-32 x 27/64" adjustable core for L45
	100889	Detent—RF tuning unit detent and shaft assembly
	77917	Form—Channel No. 6 coil form complete with core
	77912	Form—Channel No. 13 coil form complete with core
	100876	Gear—VHF channel selector gear assembly
	77861	Guide—Bakelite guide for fine tuning lever
	78270	Lever—Fine tuning lever
	72602	Pulley—VHF dial drive pulley
	78408	Screw—#6-32 x ¼" long set screw square head for VHF channel selector gear
	79199	Shaft—Fine tuning shaft and cam
	100879	Shaft—VHF channel selector shaft assembly
	100880	Shaft—VHF fine tuning shaft assembly
	78236	Shield—Front shield
	100668	Shield—Tube shield for V1, V2
	77851	Shield—"U" shaped shield for underside of unit
	79366	Socket—Tube socket, 9 pin, for 1
	79718	Socket—Tube socket for V2
	77856	Spring—Fine tuning core spring
	78241	Spring—Formed spring for stabilizing fine tuning meter
	100881	Spring—VHF drive pulley spring
		KRK38C TUNER UNIT ASSEMBLY (KRK29N VHF Section)
C1 to C4 Incl.		Part of antenna matching transformer
C5	77084	Capacitor—Ceramic, feed-thru, 1000 mmf.
C6	75199	Capacitor—Fixed, ceramic, 270 mmf., ±20%, 500 v.
C7	76532	Trimmer—Adjustable, 1-4 mmf.
C8, C9	77252	Capacitor—Fixed, ceramic, 1000 mmf., +100%, —0%, 500 v.
C10	75199	Capacitor—Fixed, ceramic, 270 mmf., ±20%, 500 v. DC (Part of S4)
C11	77151	Trimmer—Adjustable, 0.8-3.0 mmf.
C12	78276	Capacitor—Fixed, ceramic, 150 mmf., ±10%, 500 v. DC (Part of S3)
C13	71599	Capacitor—Fixed, ceramic, 270 mmf., ±20%, 500 v. DC (Part of S2)
C15	77084	Same as C5
C16	78397	Trimmer—Mica, 80-150 mmf.
C17 to C19 Incl.	77084	Same as C5
C20	78303	Capacitor—Fixed, ceramic, 82 mmf., ±10%, 500 v.
C21	77151	Same as C11
C22	77913	Capacitor—Adjustable, steatite, 0.8-3.0 mmf. (Part of S1)
C23	71504	Capacitor—Fixed, headed-lead, 0.68 mmf., ±20%, 500 v. DC (Part of S2)
C24	78247	Capacitor—Fixed, ceramic, 10 mmf., ±1 mmf., 500 v.
C25	77151	Same as C11

REPLACEMENT PARTS (Continued)

SYMBOL NO.	STOCK NO.	DESCRIPTION
C26	77865	Capacitor—Fixed, ceramic, 10 mmf., ±1.0 mmf., 500 v.
C27	79192	Trimmer—Ceramic, variable—fine tuning type
C28	73960	Capacitor—Fixed, ceramic, 10,000 mmf., 500 v.
C29	77293	Capacitor—Fixed, ceramic, 470 mmf., +100%, —0%, 500 v. (Part of C3)
C31		Capacitor—Fixed, headed-lead type, 2.2 mmf., ±20%, 500 v. DC
C33	77616	Capacitor—Adjustable mica, 4-40 mmf.
C34, C35	77293	Same as C29
C36	75437	Capacitor—Fixed, ceramic, 100 mmf., ±20%, 500 v. DC (Part of S2)
C38	71503	Capacitor—Fixed, headed-lead type, 3.3 mmf., ±20%, 500 v. DC (Part of S5)
C39		Same as C31 (Part of S3)
J1	77860	Connector—Grounding strap connector
J2	78237	Connector—Single contact female connector for UHF connection
L1 to L5 Incl.		Part of antenna matching transformer
L6	78466	Coil—RF choke
L7	76562	Coil—RF amplifier coupling coil
L8	77859	Coil—RF grid switch return connector coil
L9	79542	Coil—I.F. input coil complete with adjustable core
L10 to L13 Incl.		(Part of S3 and S5)
L14	73458	Coil—Channel No. 6 RF grid coil (Part of S3 and S5)
L15 to L19 Incl.		(Part of S3 and S5)
L20	77921	Coil—Channel No. 13 RF plate coil (Part of S3 and S5)
L21 to L26 Incl.		(Part of S3 and S5)
L27	78584	Coil—RF plate I.F. coil (Part of S3)
L28 to L31 Incl.		(Part of S3 and S5)
L32	73460	Coil—Channel No. 6 RF plate coil (Part of S3 and S5)
L33	77206	Coil—Filament choke coil
L35	76763	Coil—Heater choke coil
L36	77919	Coil—Channel No. 13 mixer coil
L37 to L42 Incl.		(Part of S1 and S2)
L43	78583	Coil—Mixer I.F. coil (Part of S1 and S2)
L44 to L47 Incl.		(Part of S1 and S2)
L48	73874	Coil—Channel No. 6 mixer coil (Part of S1 and S2)
L49	77915	Coil—Channel No. 13 oscillator coil (Part of S1 and S2)
L50 to L60 Incl.		(Part of S1 and S2)
L61	78401	Coil—Channel No. 6 antenna coil
R1	502268	Resistor—Fixed, composition, 6800 ohms, ±20%, ½ w.
R2	502112	Resistor—Fixed, composition, 120 ohms, ±10%, ½ w.
R3	502410	Resistor—Fixed, composition, 100,000 ohms, ±20%, ½ w. (Part of S2)
R4, R5	502510	Resistor—Fixed, composition, 1 meg., ±10%, ½ w.
R6	502210	Resistor—Fixed, composition, 1000 ohms, ±20%, ½ w. (Part of S3)
R7	522315	Resistor—Fixed, composition, 15,000 ohms, ±10%, ½ w.
R8		(Part of T2)
R9	502233	Resistor—Fixed, composition, 3300 ohms, ±10%, ½ w. (Part of S2)
R10, R11	502410	Same as R3 (Part of S2)
R12	502410	Same as R3
R13	522312	Resistor—Fixed, composition, 12,000 ohms, ±10%, 2 w.
R14	502182	Resistor—Fixed, composition, 820 ohms, ±10%, ½ w.
R19	502033	Resistor—Fixed, composition, 33 ohms, ±10%, ½ w. (Part of S2)
R20	502210	Same as R6
R21	502112	Same as R2
S1A	79068	Stator—Oscillator coil and stator complete with rotor, coils and trimmer (C22, L36 to L60)
S1B	78272	Stator—Mixer stator complete with rotor (C13, C23, C36, L36 to L60, R9, R10, R11, R19)
S1C	78274	Stator—RF plate stator complete with rotor, coils, resistors and capacitors (C12, C31, C39, L10 to L32, R6)
S1D	78277	Stator—Input selector switching stator complete with rotor and capacitor (C10)
S1E	78398	Stator—RF grid stator complete with rotor, coils and capacitors (C38, L10 to L32)
T1	100454	Transformer—Antenna matching transformer complete
T2	78399	Transformer—Converter transformer (R8)
	78467	Board—Antenna terminal board
	78233	Bracket—Side bracket for mounting coil and stators
	78430	Cam—Actuating cam for antenna slide switch
	78417	Cam—Fine tuning cam for VHF
	100986	Cam—VHF tuning cam and shaft
	100888	Coil—Transformer coil
	77854	Clip—Fine tuning mounting core
	77860	Connector—Grounding strap connector
	76460	Contact—Test point contact
	79193	Core—Adjustable core for fine tuning capacitor
	78582	Core—Adjustable core for RF plate I.F. coil L27 and for mixer I.F. coil L43
	77918	Core—No. ¼-20 x ½" adjusting core for L32, L44, L48
	77914	Core—No. 8-32 x 27/64" adjustable core for L20, L36, L49
	100889	Detent—RF tuner detent mechanism and shaft
	77917	Form—Channel No. 6 coil form complete with core for L14
	77912	Form—Channel No. 13 coil form complete with core
	78581	Form—Coil form for RF plate I.F. coil L27 and for mixer coil L43
	77861	Guide—Fine tuning lever guide—bakelite
	76728	Nut—No. 6-32 for capacitors 76532 and 77151
	77849	Retainer—Fine tuning spring retainer
	78419	Ring—Retaining ring for UHF channel marker escutcheon pulley
	79366	Socket—Tube, 9 pin, miniature for V1, V2
	77956	Spring—Fine tuning core spring
	78241	Spring—Antenna slide switch assembly
	100890	Switch—Antenna slide switch assembly
		KRK36 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., ±01 mmf., 500 v. DC, non-insulated
CR301	77489	Rectifier—UHF diode crystal germanium rectifier
L301, L302		Coil—RF tank plate
L303	79557	Tank Assembly—complete with capacitor (C7)
L304	79564	Board—Antenna terminal board assembly
L305 to L307 Incl.	79565	Choke—RF choke
L308, L309		Coil—Mixer coupling coil for oscillator and 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 required)
	79561	Board—Crystal mounting board assembly
	79563	Core—Adjustable core for fine tuning capacitor C307

REPLACEMENT PARTS (Continued)

SYMBOL NO.	STOCK NO.	DESCRIPTION
	79575	Cover—Crystal holder and cover
	79574	Fastener—Crystal cover fastener
	101204	Gear—Fast drive gear
	101205	Gear—RF rotor gear assembly (on gang)
	101206	Gear—UHF dial drive gear
	101209	Gear—UHF drive gear assembly (die cast)
	79569	Race—Front ball race
	79568	Screw—No. 6-20 for bearing race (1 required)
	79570	Screw—No. 10-32 set screw for rear bearing assembly
	101208	Shaft—UHF drive shaft assembly (steel)
	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
	79571	Spring—RF section ground spring—front
	79572	Spring—Rotor section ground springs (4 required)
	101203	Stop—UHF gang stop with 1 wing
	101201	Stop—UHF gang stop with 2 wings
	101202	Stop—UHF gang stop with 3 wings
	79582	Support—Oscillator stator support—steatite
	35969	Washer—"C" washer—for RF rotor gear
	101212	Washer—RF rotor gear insulating washer
	100674	Washer—spring washer—for RF rotor gear
	33726	Washer—UHF drive gear washer, "C" type
		CHASSIS ASSEMBLIES
		KCS-101, KCS-101A
C101	76507	Capacitor—Fixed, ceramic, 3 mmf., 500 v.
C102	79324	Capacitor—Fixed, ceramic, 56 mmf., 500 v.
C103	73960	Capacitor—Fixed, ceramic, .01 mf., 500 v.
C104		Part of T102
C105	73599	Capacitor—Fixed, paper, .0027 mf., 600 v.
C106	39652	Capacitor—Fixed, mica, 1000 mmf., 500 v.
C107	79316	Capacitor—Fixed, paper, .01 mf., 200 v.
C108	79148	Capacitor—Fixed, paper, 0.47 mf., 200 v.
C109	79014	Capacitor—Fixed, paper, .01 mf., 200 v.
C110	73920	Capacitor—Fixed, paper, .0047 mf., 400 v.
C111	73562	Capacitor—Fixed, paper, .022 mf., 400 v.
C112	73561	Capacitor—Fixed, paper, .01 mf., 400 v.
C113	73803	Capacitor—Fixed, paper, .0022 mf., 1000 v.
C114A, B, C, D	100858	Capacitor—Electrolytic, 100/10/30/20 mf., 400/400/50/50 v. DC
C117	39638	Capacitor—Fixed, mica, 270 mmf., 500 v.
C118	100849	Trimmer—I.F. link, 10-160 mmf.
C119	77252	Capacitor—Fixed, ceramic, .001 mf., 500 v.
C120	39044	Capacitor—Fixed, ceramic, 15 mmf., 500 v.
C121	78622	Capacitor—Fixed, ceramic, 470 mmf., 500 v.
C122	79318	Capacitor—Fixed, paper, 0.39 mf., 200 v.
C123	77293	Capacitor—Fixed, ceramic, 470 mmf., 500 v. DC
C124	77252	Capacitor—Fixed, ceramic, .001 mf., 500 v. DC
C125	100350	Capacitor—Fixed, ceramic, 39 mmf., 500 v.
C126	78623	Capacitor—Fixed, ceramic, .001 mf., 500 v.
C127	77293	Same as C123
C128	100672	Capacitor—Fixed, ceramic, 220 mmf., 500 v.
C131	101439	Capacitor—Fixed, ceramic, 8 mmf., 500 v.
C140	77252	Same as C119
C141	73552	Capacitor—Fixed, paper, .033 mf., 400 v.
C142	39636	Capacitor—Fixed, mica, 220 mmf., 500 v.
C143	73561	Capacitor—Fixed, paper, .01 mf., 400 v.
C144	73595	Capacitor—Fixed, paper, .0022 mf. 600 v.
C145	73920	Capacitor—Fixed, paper, .0047 mf., 600 v.
C146	79315	Capacitor—Fixed, paper, .0033 mf., 400 v.
C147	73553	Capacitor—Fixed, paper, .047 mf., 400 v.
C148	79016	Capacitor—Fixed, paper, .068 mf., 200 v.
C149	73561	Capacitor—Fixed, paper, .01 mf., 400 v.
C150	73798	Capacitor—Fixed, paper, .022 mf., 600 v.
C151	100303	Capacitor—Fixed, paper, .027 mf., 600 v.
C152	73849	Capacitor—Fixed, paper, .001 mf., 1600 v.
C153	76474	Capacitor—Fixed, mica, 82 mmf., 1000 v.
C154	76475	Capacitor—Fixed, mica, 68 mmf., 1000 v.
C155	73551	Capacitor—Fixed, paper, 0.1 mf., 400 v.
C156	79932	Capacitor—Fixed, paper, .022 mf., 400 v.
C157	79148	Capacitor—Fixed, paper, 0.47 mf., 200 v.
C158	76476	Capacitor—Fixed, mica, 330 mmf., 1000 v.
C159	73594	Capacitor—Fixed, paper, .01 mf., 600 v.
C160	74250	Capacitor—Fixed, mica, 560 mmf., 1000 v.
C161	76995	Capacitor—Fixed, paper, .0012 mf., 600 v.
C162	79376	Trimmer—Horizontal drive, 10-160 mmf.
C163	73551	Capacitor—Fixed, paper, 0.1 mf., 400 v.
C164	73557	Capacitor—Fixed, paper, 0.1 mf., 600 v.
C165	73786	Capacitor—Fixed, paper, 0.27 mf., 200 v.
C166	73551	Same as C163
C167	101295	Capacitor—Fixed, ceramic, 330 mmf., 1500 v.
C168	73597	Capacitor—Fixed, paper, .047 mf., 1000 v.
C169	76579	Capacitor—Fixed, mica, 270 mmf., 1000 v.
C173 to C175 Incl.	73473	Capacitor—Fixed, ceramic, .0047 mf., 500 v.
C176	79530	Capacitor—Fixed, paper, .015 mf., 200 v.
C177	74250	Capacitor—Fixed, mica, 560 mmf., 1000 v.
C180	73960	Same as C103
C181	101808	Capacitor—Fixed, paper, 0.47 mf., ±20%, 200 v. (with 1 lead grounded to mounting bracket)
C182	73787	Capacitor—Fixed, paper, 0.47 mf., 200 v.
C184	39640	Capacitor—Fixed, ceramic, 330 mmf., 500 v.
C185	73960	Capacitor—Fixed, ceramic, .01 mf., 500 v.
C186	79018	Capacitor—Fixed, paper, .0039 mf., 400 v.
C187	39640	Same as C184
C188	79149	Capacitor—Fixed, paper, 0.1 mf., 600 v.
C189	73960	Same as C185
C190	78143	Capacitor—Fixed, mica, 820 mmf., 300 v.
C191	79740	Capacitor—Fixed, paper, 0.22 mf., 200 v.
C192	73664	Capacitor—Fixed, ceramic, 39 mmf., 500 v.
C193	101824	Capacitor—Fixed, ceramic, 9 mmf., 1000 v.
C194	79149	Same as C188
C195A, B, C	100859A	Capacitor—Electrolytic, 100/10/80 mf., 400/400/350 v. DC
C199	73557	Capacitor—Fixed, paper, 0.1 mf., 600 v.
C200	77625	Capacitor—Fixed, ceramic, 220 mmf., 500 v.
C201	79017	Capacitor—Fixed, paper, .0047 mf., 400 v.
C202	73551	Same as C163
C203	73553	Capacitor—Fixed, paper, .047 mf., 400 v.
C205	77252	Capacitor—Fixed, ceramic, .001 mf., 500 v. For KCS101-A only
C210	100453	Capacitor—Fixed, ceramic, 150 mmf., 2500 v.
C211	100104	Capacitor—Fixed, ceramic, 270 mmf., 500 v.
C214	78623	Same as C126
C215	77293	Same as C123
C216	73960	Capacitor—Fixed, ceramic, .01 mf., 500 v.
C218	73960	Same as C103
C219	100672	Capacitor — Fixed, ceramic, 220 mmf., ±20%, 500 v. DC
CR101	100844	Crystal—AGC
F101	78214	Fuse—.3 amp.
FN101	101246	Network—Filter network Includes C184, C187, R199, R200, R226 (Pt. of PC103)
J102	100477	Connector—Deflection yoke 6 contact male
L101	78204	Trap—1st. I.F. grid trap.
L102	101819	Coil—Peaking, 36 microhenry
L103	101287	Coil—Peaking, 250 microhenry
L104	101286	Coil—4½ m.c. trap
L105	101290	Coil—Peaking, 120 microhenry
L106	101288	Coil—Peaking, 180 microhenry
L107	79966	Coil—Horizontal frequency
L108	100300	Coil—Sine wave
L109	100853	Coil—Width coil
L110	76640	Choke—R.F., 1.5 muh
L111	77676	Choke—R.F. choke
L116, L117	73477	Choke—Filament choke replacement for PC102
L118	101289	Coil—Peaking, 300 microhenry
L121		Same as L118
PC101	101799	Circuit—Printed I.F. sound assembly less tubes
PC102	100800	Circuit—Printed pix I.F. assembly less tubes
PC103	100804	Circuit—Printed video circuit assembly
PC104	100798	Circuit—Printed sync. & vertical

REPLACEMENT PARTS (Continued)

SYMBOL NO.	STOCK NO.	DESCRIPTION
PC105	100797	Circuit—Syncroguide and horiz. osc. printed circuit
R101	502347	Resistor—Fixed, composition, 47,000 ohms, ±10%, ½ w.
R102	502022	Resistor—Fixed, composition, 22 ohms, ±5%, ½ w.
R103	502110	Resistor—Fixed, composition, 100 ohms, ±20%, ½ w.
R104, R105	502310	Resistor—Fixed, composition, 10,000 ohms, ±5%, ½ w.
R106	502339	Resistor—Fixed, composition, 39,000 ohms, ±10%, ½ w.
R107A, B	101794	Control—"On-Off" volume and picture control
R108	502610	Resistor—Fixed, composition, 10 megohms, ±20%, ½ w.
R109	502347	Resistor—Fixed, composition, 47,000 ohms, ±10%, ½ w.
R110	502368	Resistor—Fixed, composition, 68,000 ohms, ±20%, ½ w.
R111	502447	Resistor—Fixed, composition, 470,000 ohms, ±20%, ½ w.
R112	512156	Resistor—Fixed, composition, 560 ohms, ±10%, 1 w.
R113	77670	Resistor—Fixed, w.w., 3300 ohms, ±10%, 7 w., ceramic insulated.
R116	502156	Resistor—Fixed, composition, 560 ohms, ±10%, ½ w.
R118	502347	Resistor—Fixed, composition, 47,000 ohms, ±5%, ½ w.
R119	502210	Resistor—Fixed, composition, 1000 ohms, ±20%, ½ w.
R120	502056	Resistor—Fixed, composition, 56 ohms, ±5%, ½ w.
R122	502168	Resistor—Fixed, composition, 680 ohms, ±20%, ½ w.
R123	502139	Resistor—Fixed, composition, 390 ohms, ±10%, ½ w.
R124, R125	502415	Resistor—Fixed, composition, 150,000 ohms, ±5%, ½ w.
R126	502047	Resistor—Fixed, composition, 47 ohms, ±5%, ½ w.
R127	502168	Resistor—Fixed, composition, 680 ohms, ±20%, ½ w.
R128	502113	Resistor—Fixed, composition, 130 ohms, ±5%, ½ w.
R129	502147	Resistor—Fixed, composition, 470 ohms, ±20%, ½ w.
R136	502210	Same as R119
R137	502310	Resistor—Fixed, composition, 10,000 ohms, ±20%, ½ w.
R138	502422	Resistor—Fixed, composition, 220,000 ohms, ±20%, ½ w.
R140	502415	Resistor—Fixed, composition, 150,000 ohms, ±20%, ½ w.
R141	502422	Resistor—Fixed, composition, 220,000 ohms, ±10%, ½ w.
R142	502410	Resistor—Fixed, composition, 100,000 ohms, ±20%, ½ w.
R143	101795	Control—Brightness control
R145	512115	Resistor—Fixed, composition, 150 ohms, ±10%, 1 w.
R147	502456	Resistor—Fixed, composition, 560,000 ohms, ±10%, ½ w.
R148	502227	Resistor—Fixed, composition, 2700 ohms, ±5%, ½ w.
R149	512268	Resistor—Fixed, composition, 6800 ohms, ±10%, 1 w.
R150	502333	Resistor—Fixed, composition, 33,000 ohms, ±10%, ½ w.
R151	502322	Resistor—Fixed, composition, 22,000 ohms, ±10%, ½ w.
R152	502318	Resistor—Fixed, composition, 18,000 ohms, ±10%, ½ w.
R153	502568	Resistor—Fixed, composition, 6.8 meg., ±10%, ½ w.
R154	502482	Resistor—Fixed, composition, 820,000 ohms, ±10%, ½ w.
R155	101796	Control—Vertical hold control
R156	100290	Control—Height control
R157	502447	Resistor—Fixed, composition, 470,000 ohms, ±20%, ½ w.
R158	502322	Same as R151
R159	502510	Resistor—Fixed, composition, 1.0 megohms, ±10%, ½ w.
R160	100864	Control—Vertical linearity control
R161	502282	Resistor—Fixed, composition, 8200 ohms, ±10%, ½ w.
R162	502315	Resistor—Fixed, composition, 15,000 ohms, ±10%, ½ w.
R163	502318	Resistor—Fixed, composition, 18,000 ohms, ±5%, ½ w.
R164	502447	Resistor—Fixed, composition, 470,000 ohms, ±20%, ½ w.
R165	502433	Resistor—Fixed, composition, 330,000 ohms, ±10%, ½ w.
R166	512322	Resistor—Fixed, composition, 22,000 ohms, ±5%, 1 w.
R167	502422	Resistor—Fixed, composition, 220,000 ohms, ±10%, ½ w.
R168	502433	Resistor—Fixed, composition, 330,000 ohms, ±10%, ½ w.
R169	502482	Resistor—Fixed, composition, 820,000 ohms, ±10%, ½ w.
R170	502415	Resistor—Fixed, composition, 150,000 ohms, ±10%, ½ w.
R171	502382	Resistor—Fixed, composition, 82,000 ohms, ±5%, ½ w.
R172	502239	Resistor—Fixed, composition, 3900 ohms, ±10%, ½ w.
R173	512410	Resistor—Fixed, composition, 100,000 ohms, ±20%, 1 w.
R174	502568	Resistor—Fixed, composition, 6.8 megohms, ±10%, ½ w.
R175	502347	Resistor—Fixed, composition, 47,000 ohms, ±10%, ½ w.
R176	502482	Same as R169
R177	512339	Resistor—Fixed, composition, 39,000 ohms, ±10%, 1 w.
R178	502510	Resistor—Fixed, composition, 1.0 megohms, ±10%, ½ w.
R179	502047	Resistor—Fixed, composition, 47 ohms, ±20%, ½ w.
R180	522110	Resistor—Fixed, composition, 100 ohms, ±5%, 2 w.
R181	502268	Resistor—Fixed, composition, 6800 ohms, ±10%, ½ w.
R182	502427	Resistor—Fixed, composition, 270,000 ohms, ±10%, ½ w.
R183	502368	Resistor—Fixed, composition, 68,000 ohms, ±20%, ½ w.
R184	502222	Resistor—Fixed, composition, 2200 ohms, ±10%, ½ w.
R185, R186		Part of Yoke
R187	502510	Resistor—Fixed, composition, 1 megohm, ±5%, ½ w.
R188	502356	Resistor—Fixed, composition, 56,000 ohms, ±5%, ½ w.
R189	502247	Resistor—Fixed, composition, 4700 ohms, ±20%, ½ w.
R190	502368	Resistor—Fixed, composition, 68,000 ohms, ±5%, ½ w.
R191	502415	Resistor—Fixed, composition, 150,000 ohms, ±5%, ½ w.
R192	502312	Resistor—Fixed, composition, 12,000 ohms, ±10%, ½ w.
R193	522347	Resistor—Fixed, composition, 47,000 ohms, ±10%, 2 w.
R194	502356	Resistor—Fixed, composition, 56,000 ohms, ±10%, ½ w.
R195	502333	Resistor—Fixed, composition, 33,000 ohms, ±10%, ½ w.
R196	502339	Resistor—Fixed, composition, 39,000 ohms, ±10%, ½ w.
R197	100845	Resistor—Fixed, wire wound, .68 ohms, ±5%, 1/3 w.
R198	100862	Control—AGC control
R199	502427	Resistor—Fixed, composition, 270,000 ohms, ±10%, ½ w. Pt. of FN 101
R200	502512	Resistor—Fixed, composition, 1.2 megohms, ±10%, ½ w. Pt. of FN101
R201	502510	Resistor—Fixed, composition, 1 megohm, ±10%, ½ w.
R202	502333	Same as R195
R204	512182	Resistor—Fixed, composition, 820 ohms, ±10%, 1 w.
R205	502327	Resistor—Fixed, composition, 27,000 ohms, ±10%, ½ w.
R206	502447	Resistor—Fixed, composition, 470,000 ohms, ±10%, ½ w.
R207	100863	Control—Syncroguide stabilizer
R208	502456	Resistor—Fixed, composition, 560,000 ohms, ±10%, ½ w.

REPLACEMENT PARTS (Continued)

SYMBOL NO.	STOCK NO.	DESCRIPTION
R209	502218	Resistor—Fixed, composition, 1800 ohms, ±5%, ½ w.
R210	502222	Resistor—Fixed, composition, 2200 ohms, ±5%, ½ w.
R211	502118	Resistor—Fixed, composition, 180 ohms, ±10%, ½ w.
R212	502322	Resistor—Fixed, composition, 22,000 ohms, ±10%, ½ w.
R213	522310	Resistor—Fixed, composition, 10,000 ohms, ±10%, 2 w.
R214	502347	Resistor—Fixed, composition, 47,000 ohms, ±10%, ½ w.
R215	502422	Resistor—Fixed, composition, 220,000 ohms, ±10%, ½ w.
R216	502382	Resistor—Fixed, composition, 82,000 ohms, ±10%, ½ w.
R218	512230	Resistor—Fixed, composition, 3000 ohms, ±5%, 1 w.
R219	502447	Resistor—Fixed, composition, 470,000 ohms, ±10%, ½ w.
R221	100846	Resistor—Fixed, wire wound, 4200 ohms, ±10%, 7 w.
R223	512156	Resistor—Fixed, composition, 560 ohms, ±10%, 1 w.
R225	522218	Resistor—Fixed, composition, 1800 ohms, ±10%, 2 w.
R226	502510	Resistor—Fixed, composition, 1.0 megohms, ±10%, ½ w. Pt. of FN101
R227	522218	Same as R225
R228	502447	Same as R219
R229	502233	Resistor—Fixed, composition, 3300 ohms, ±20%, ½ w.
R230	502315	Resistor—Fixed, composition, 15,000 ohms, ±20%, ½ w.
R231	512127	Resistor—Fixed, composition, 270 ohms, ±10%, 1 w.
R232	502539	Resistor—Fixed, composition, 3.9 megohms, ±10%, ½ w.
R233	502510	Resistor—Fixed, composition, 1 megohm, ±10%, 1 w.
R234	502315	Same as R230
R239	101797	Control—Tone control
R240	502082	Resistor—Fixed, composition, 82 ohms, ±10%, ½ w.
T101	101220	Transformer—Sound take-off transformer
T102	101219	Transformer—Ratio detector transformer (Includes C104)
T103	100856	Transformer—Audio output transformer
T104	78203	Transformer—1st. I.F. grid transformer
T105 to T107 Incl.	101588 or 76433	Transformer—2nd, 3rd, 4th pix I.F. transformer (For PC102—with plug-in type coils) Transformer—2nd, 3rd, 4th pix I.F. transformer (For PC102—with printed coils) (See Special Note on page 27)
T108	100867	Transformer—Vertical output transformer
T109	100860	Transformer—Hi-voltage transformer
T110	100855	Transformer—Power transformer
	100477	Connector—Deflection yoke, 6 contact male connector
	74594	Connector—Power input connector, 2 contact male
	101800	Connector—3 contact female for timer cable assembly
	75474	Eyelet—Speaker cable connector eyelet
	11889	Grommet—2nd anode lead grommet
	78217	Holder—Fuse holder
	101798	Knob—Horizontal frequency coil knob
	78215	Insulator—Hi-voltage insulator
	79329	Retainer—Horizontal frequency coil knob retainer
	100348	Screw—1st, 2nd, 3rd I.F. pix tuning screw
	76972	Shield—Tube shield for V101 & V106
	73584	Shield—Tube shield for V102, V104 & V105
	101213	Shield—Tube shield for V108
	100850	Socket—High voltage tube socket assembly
	74834	Socket—Kine socket & lead
	31251	Socket—Tube socket for V113 & V117
	68590	Socket—Tube socket for V115
	101215	Socket—Tube socket, 7 pin miniature for V102
	101214	Socket—Tube socket, 7 pin miniature for V103
	101281	Socket—Tube socket, 7 pin miniature for V104 & V105
	101310	Socket—Tube socket, 7 pin miniature for V109
	100302	Socket—Tube socket, 7 pin miniature for V111
	101217	Socket—Tube socket, 9 pin miniature for V101
	101282	Socket—Tube socket, 9 pin miniature for V106
	101284	Socket—Tube socket, 9 pin miniature for V107
	101283	Socket—Tube socket, 9 pin miniature for V108
	100301	Socket—Tube socket, 9 pin miniature for V110
	100298	Socket—Tube socket, 9 pin miniature for V112
	100347	Washer—Insulating washer for tuning slug
	78219	Washer—Vellutex for high voltage insulator
		YOKE AND MAGNET ASSEMBLY
	77869	Cushion—Rubber cushion for yoke hood
	78867	Cushion—Rubber cushion for yoke plate
	79875	Hood—Deflection yoke hood assembly
	101129	Magnet—Centering magnet
	76141	Magnet—Ion trap magnet
	77871	Nut—Knurled nut for focus magnet
	78866	Nut—Knurled nut for yoke mounting plate
	101120	Plate—Yoke mounting plate
	78445	Spring—Yoke grounding spring
	101147	Yoke—Deflection yoke assembly complete with connector Includes C171, L112, L113, L114, L115, P102, R185, R186
		SPEAKER ASSEMBLY **971490-6**
	74664	Speaker—8" P.M. complete with cone and voice coil (3.2 ohms)
		MISCELLANEOUS
	101801	Back—Cabinet back assembly complete with terminals and power cord
	101802	Back—Cabinet back assembly complete with power cord
	101160	Bracket—Kine mounting bracket assembly
	101818	Bracket—Timer mounting bracket (lower)
	101817	Bracket—Timer mounting bracket (upper)
	101809	Cap—Rubber cap for hidden control shafts
	79432	Clamp—Top, bottom and side safety glass retainer clamp (10 req'd)
	X3527	Cloth—Cabinet grille cloth for mahogany grain instruments
	X3528	Cloth—Cabinet grille cloth for oak grain instruments
	75474	Connector—Antenna cable connector (2 req'd)
	77726	Connector—2 contact male for antenna cable
	101816	Connector—3 contact male for timer mechanism
	71457	Cord—Power cord and plug
	101804	Cover—Cover and case assembly—mahogany—for hidden controls for mahogany instruments
	101805	Cover—Cover and case assembly—oak—for hidden controls for oak instruments
	79239	Cushion—Rubber for safety glass (long)
	79238	Cushion—Rubber for safety glass (short)
	79411	Cushion—Rubber for safety glass retainer clamps
	101812	Cushion—Rubber for timer dial mounting
	101823	Decal—Control marker for hidden controls
	101820	Decal—Control marker decal
	101814	Dial—Timer dial
	101148	Dial—UHF dial—dark wine—for mahogany grain instruments for Model 21T639U
	101149	Dial—UHF dial—taupe—for limed oak instruments for Model 21T639U

REPLACEMENT PARTS (Continued)

SYMBOL NO.	STOCK NO.	DESCRIPTION
	101302	Emblem—"Super" emblem brass plated
	101303	Emblem—"Super" emblem brown maroon
	101813	Escutcheon—Timer dial escutcheon
	79235	Glass Safety glass
	101278	Insert—Safety glass corner insert assembly (4 req'd)
	101123	Insulation—Volume control shield insulation
	101124	Knob—Contrast control—gold
	101138	Knob—Volume—dark wine—for mahogany grain instruments
	100621	Knob—Volume—taupe—for limed oak instruments
	101811	Knob—Timer hand knob (Time set)
	101810	Knob—Timer switch knob and set knob—clear polystyrene (Start time or view time)
	100946	Knob—UHF channel selector—dark wine—for mahogany grain instruments for Model 21T639U
	100947	Knob—UHF channel selector—taupe—for oak grain instruments for Model 21T639U
	101806	Knob—UHF tuning—dark wine—for mahogany grain instruments for Model 21T639U
	101807	Knob—UHF tuning—taupe—for oak grain instruments for Model 21T639U
	100944	Knob—VHF channel selector—wine—for mahogany grain instruments for Model 21T63J
	100945	Knob—VHF channel selector—taupe—for oak grain instruments for Model 21T639
	101276	Knob—VHF and UHF fine tuning control knob—gold
	11891	Lamp—Channel indicator lamp for Model 21T639U only
	101130	Mask—Kinescope mask assembly (metal)
	100699	Nail—UHF channel marker nail
	75691	Spring—Link cable and contrast lead spring
	78324	Spring—Safety glass retainer and back cover spring
	78871	Spring—Yoke and kine socket lead spring
	101157	Strap—Aluminum ground strap mask to chassis
	101159	Strap—Kine mounting tie strap (2 req'd)
	101277	Retainer—Safety glass clamp retainer (10 req'd)
	79419	Retainer—Side safety glass retainer
	79418	Retainer—Top and bottom safety glass retainer
	101803	Terminal—Cabinet back antenna terminals (2 req'd) for VHF only

CLOCK ASSEMBLY

Clock—If clock mechanism repair becomes necessary, remove the clock from the receiver. The RCA Victor Distributor in your area will advise you of the address of the nearest authorized service station for clock mechanisms. Repair facilities and replacement parts are available at these authorized service stations.