RCA VICTOR

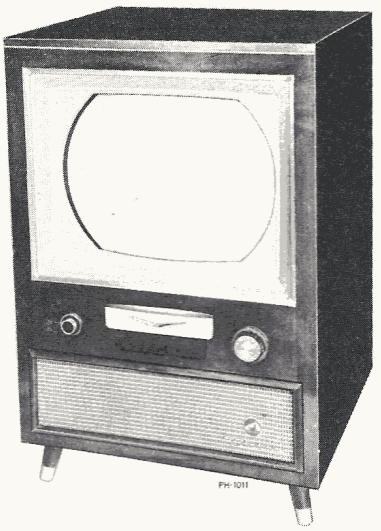
COLOR TELEVISION RECEIVER

MODEL 21-CT-55

Chassis Nos. — Main Television Chassis CTC2B — Convergence Chassis CTC3A — Mfr. No. 274 —

SERVICE DATA

— 1954 No. T13 —



Model 21-CT-55
Color Television Receiver

PREPARED BY RCA SERVICE CO., INC.
FOR
RADIO CORPORATION OF AMERICA
RCA VICTOR TELEVISION DIVISION
CAMDEN, N. J., U.S.A.

GENERAL DESCRIPTION

Model 21-CT-55 is a "21 inch" color television receiver, capable of reception of either black and white or color programs. The receiver employs a shadow mask, three gun, directly viewed, 21 inch metal kinescope.

The receiver features: 12 channel, VHF coverage plus any 4 UHF channels desired; intercarrier FM sound system; high level second detector operation for maximum linearity; stabilized horizontal AFC; magnetic convergence and electrostatic focus; crystal controlled AFC color synchronization; low level color demodulation; kinescope grid drive with D.C. restoration, and a color "killer" circuit to disable the color channel during black and white reception.

Additional features include: a removable top panel to facilitate servicing and adjustment, and the location of most of the functional controls at the receiver front. These controls are located under the tilt-down control cover or behind the removable panel directly below the control cover. Dual loudspeakers are provided for sound reproduction.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

PICTURE SIZE. . Approx. 250 sq. ins. on a 21AXP22 Kinescope

TELEVISION R-F FREQUENCY RANGE

Any of 70 UHF channels. . . . . 470 mc. to 890 mc.
Any of 12 VHF channels, 54 mc. to 88 mc., 174 mc. to 216 mc.
(Any desired combination of 16 UHF and/or VHF channels may be used.)

INTERMEDIATE FREQUENCIES

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

POWER RATING. . . . . 115 V. A.C., 60 Cy., 525 watts

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

SWEEP DEFLECTION. . . . . Magnetic

FOCUS. . . . . Electrostatic

CONVERGENCE. . . . . Magnetic

ANTENNA INPUT IMPEDANCE

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

RCA TUBE COMPLEMENT

	Tube Used	Function
(1)	RCA 6BQ7A	R-F Amplifier (VHF Only)
(2)	RCA 6AF4	R-F Oscillator
(3)	RCA 6U8 A K3E Crystal is used as a mixer	I-F Amplifier
(4)	RCA 6DC6	1st Picture I-F Amplifier
(5)	RCA 6DC6	2nd Picture I-F Amplifier
(6)	RCA 6DC6	3rd Picture I-F Amplifier
(7)	RCA 6AN8	4th Picture I-F Amplifier and Killer
(8)	RCA 6CL6 A 1N60 Crystal is used as the picture 2nd Detector	5th Picture I-F Amplifier
(9)	RCA 6CL6	1st Video Amplifier
(10)	RCA 6AN8 A 1N60 Crystal is used as the Sound Detector	2nd Video Amplifier and "Q" Phase Splitter
(11)	RCA 6U8	1st Sound I-F Amplifier & Vert. Osc.
(12)	RCA 6AU6	Driver
(13)	RCA 6AL5	Ratio Detector
(14)	RCA 6AV6	1st Audio Amplifier
(15)	RCA 6AQ5	Audio Output
(16)	RCA 12AT7	Vertical Sync. Separator and Sync. Output
(17)	RCA 6BL7GT	Vertical Output
(18)	RCA 6AN8	Horiz. Sync. Separator and AGC
(19)	RCA 6SN7GT	Horiz. Sweep Oscillator and Control
(20)	RCA 6CB5	Horiz. Sweep Output
(21)	RCA 6BL4	Damper
(22)	RCA 3A2	Focus Rectifier
(23)	RCA 3A2 (two tubes)	High Voltage Rectifiers
(24)	RCA 6BK4	Shunt Regulator
(25)	RCA 6AN8	Band Pass Amplifier and Keyer
(26)	RCA 6BY6	"Q" Demodulator
(27)	RCA 6AN8	Burst Amplifier and Phase Detector
(28)	RCA 6AN8	3.58 MC Osc. and Reactance
(29)	RCA 6AN8	3.58 MC CW Amplifier and Phase Detector
(30)	RCA 6BY6	"R-Y" Demodulator
(31)	RCA 6AN8	"R-Y" Amplifier and Phase Splitter
(32)	RCA 12BH7	Green Adder and Output
(33)	RCA 12BH7	Blue Adder and Output
(34)	RCA 12BH7	Red Adder and Output
(35)	RCA 6BC7	Green, Blue and Red D.C. Restorers
(36)	RCA 21AXP22 Two selenium rectifiers are used for Low Voltage rectification.	Kinescope

First Edition—First Printing 11-24-54

Printed in U. S. A.

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

OPERATING CONTROLS (FRONT)

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

NON-OPERATING CONTROLS (FRONT)

(Behind control cover box)

Blue Background	Screwdriver Adjustment
Green Background	Screwdriver Adjustment

(Behind removable panel)

Height	Screwdriver Adjustment
Vert. Linearity	Screwdriver Adjustment
Video Blue Gain	Screwdriver Adjustment
Video Green Gain	Screwdriver Adjustment
Blue Screen	Screwdriver Adjustment
Green Screen	Screwdriver Adjustment
Red Screen	Screwdriver Adjustment
AGC	Screwdriver Adjustment
*Sound Level	Screwdriver Adjustment

* *Adjustment accessible only with chassis removed from cabinet.*

NON-OPERATING CONTROLS (REAR)

Focus	Screwdriver Control
High Voltage	Screwdriver Control
Width	Screwdriver Control
Horizontal Linearity	Screwdriver Adjustment
Horizontal Centering	Screwdriver Control
Vertical Centering	Screwdriver Control

NON-OPERATING CONTROLS (TOP OF CHASSIS)

AFC Balance	Single Control
"R-Y" Gain	Single Control
Horizontal Drive	Single Control
Horiz. Locking Range	Screwdriver Adjustment
Purifying	Magnet Adjustment
Magnetic Field Equal.	(8) Magnet Adjustments
Blue Beam Positioning	Magnet Adjustment
Tuner I-F Trap	Screwdriver Adjustment
FM Trap	Screwdriver (on Antenna lead)
Sound Reject	Screwdriver Adjustment

CONVERGENCE CHASSIS CONTROLS

Red Vertical Amplitude, Red Vertical Tilt	Dual Control
Green Vertical Amplitude, Green Vertical Tilt	Dual Control
Blue Vertical Amplitude, Blue Vertical Tilt	Dual Control
Red Horizontal Amplitude, Blue Horizontal Amplitude	Dual Control
Green Horizontal Amplitude	Single Control
Red Horizontal Phasing	Trimmer Adjustment
Green Horizontal Phasing	Trimmer Adjustment
Blue Horizontal Phasing	Trimmer 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 COVER OPENED. BEFORE TURNING THE RECEIVER ON, INSURE THAT THE GROUND SPRING BETWEEN THE CHASSIS AND THE KINESCOPE YOKE SHIELD AND THE STRAP BETWEEN THE YOKE ASSEMBLY AND THE COVERGENCE MAGNET ASSEMBLY ARE FASTENED AND MAKING CONTACT. BE SURE THE GROUND LEADS TO THE FRONT TRIM ASSEMBLY ARE IN PLACE.

KINESCOPE HANDLING PRECAUTIONS

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

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

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

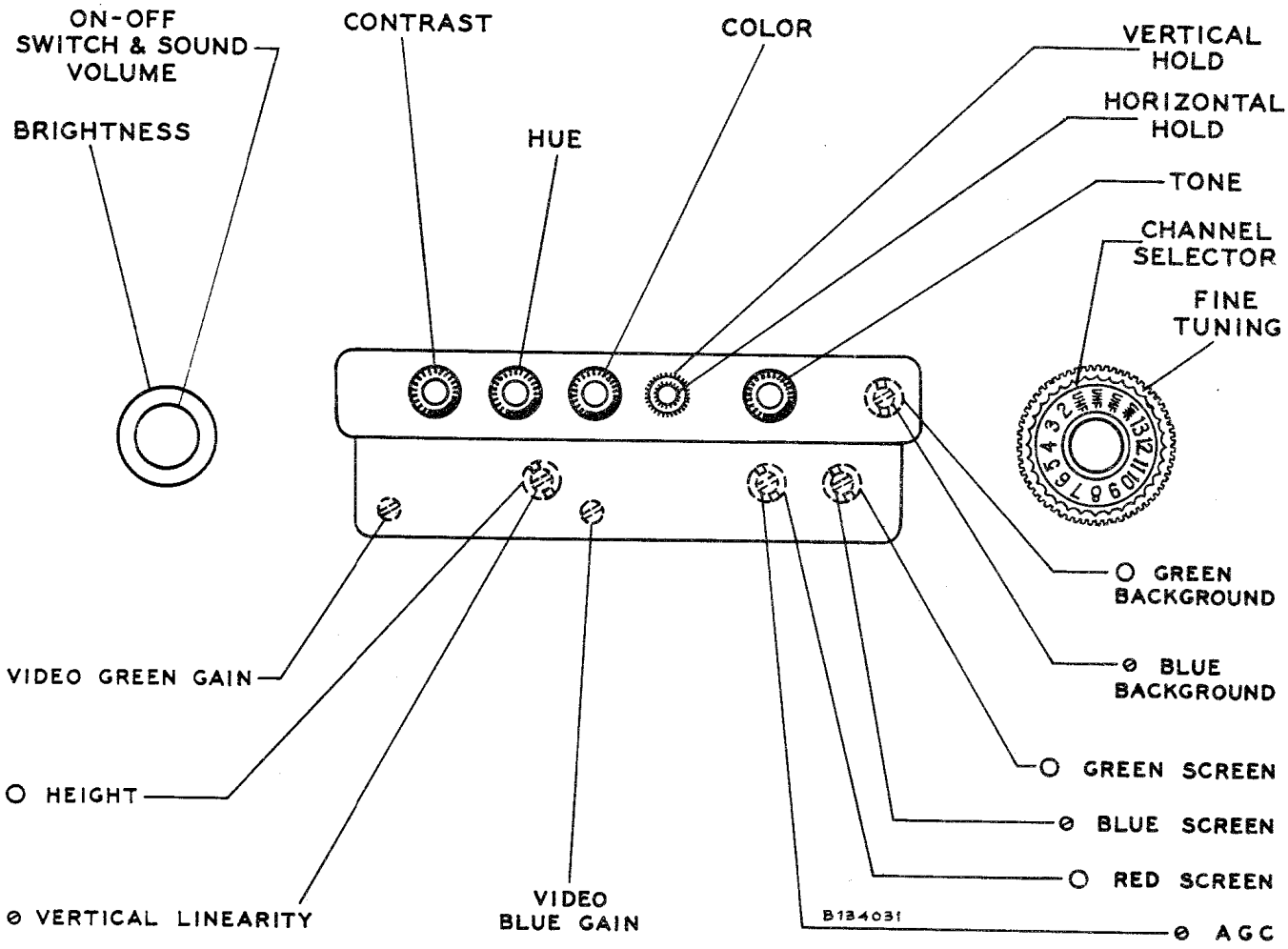


Figure 1—Operating Controls and Front Adjustments

OPERATING INSTRUCTIONS

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

BLACK and WHITE RECEPTION

1. Turn the COLOR control fully counter-clockwise and turn the receiver "ON". Advance the SOUND VOLUME control to approximately mid-position.
2. Set the CHANNEL SELECTOR to the desired channel.
3. Advance the CONTRAST control to approximately mid-position.
4. Adjust the FINE TUNING control for best picture quality and the SOUND VOLUME for suitable volume.
5. Turn the BRIGHTNESS control fully counter-clockwise then clockwise until a light pattern appears on the screen.
6. Adjust the VERTICAL HOLD control until the pattern stops vertical movement.
7. Adjust the HORIZONTAL HOLD control until a picture is obtained and centered.
8. Turn the BRIGHTNESS control counter-clockwise until the raster just disappears.
9. Adjust the CONTRAST control for suitable picture contrast.
10. Adjust the TONE control for the desired tonal quality.
11. In switching from one channel to another, it may be necessary to repeat steps numbers 4 and 9.
12. When the receiver is turned on again after an idle period, it should not be necessary to repeat the adjustments if the position of the controls have not been changed. If any adjustment is necessary, steps 4 and 9 are generally sufficient.

COLOR RECEPTION

1. Adjust the receiver for a black and white picture as outlined above, with the fine tuning control advanced to its most clockwise position where most detailed picture is obtained.
2. Set the CHANNEL SELECTOR to the desired channel broadcasting a color program.
3. Advance the COLOR control approximately two-thirds from its maximum counter-clockwise position.
4. Carefully advance the FINE TUNING control clockwise* until the picture just begins to disappear, then counter-clockwise*, *slowly* to the position where sound bars just disappear from the picture and color is in the picture.
5. Adjust the COLOR control for the desired saturation or strength of color.
6. Adjust the HUE control for hue quality of the picture (redness, blueness, etc.)—to achieve the most pleasing flesh tones or color of some familiar object.

* *Direction of rotation reversed on UHF channels.*

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

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

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

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

CAUTION: Removal of the rear cabinet screen actuates the H.V. shorting bar, grounding out the high voltage capacitor. Do not turn on the receiver with the shorting bar against the H.V. rectifier corona cup. To do so will result in failure of the H.V. fuse F101.

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

Connect the antenna transmission line to the receiver.

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

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 it will be necessary to adjust the AGC control.

Remove the metal control cover box and the cabinet panel below the cover box. To do this, remove the four knobs under the control cover by grasping each firmly to pull out. Remove the two round-head screws holding the cover box in place. Carefully slide the cover box assembly outward.

Grasp the top of the removable cabinet panel and slide the panel upward approximately one-half inch and remove. The front service adjustments will now be accessible.

Turn the AGC control counter-clockwise until the receiver operates normally and the picture can be synchronized. (Refer to figure 1 for adjustment location.)

It should be noted here that only the adjustment of the AGC control should be made at this time.

Adjustment of the other controls accessible under the removable panel should be made only after an understanding of their functions has been acquired. The proper adjustment of each control is explained in later sections of this publication.

At this point it is necessary to adjust the horizontal oscillator and to make the conventional adjustments of focus, height, vertical linearity, horizontal linearity, width, drive, and electrical centering if such adjustments are found necessary.

CHECK OF HORIZONTAL OSCILLATOR ALIGNMENT. — Turn the horizontal hold control to the extreme counter-clockwise position. The picture should remain in horizontal sync. Momentarily remove the signal by switching off channel then back. Normally the picture will be out of sync. Turn the control clockwise slowly. The number of diagonal black bars will be gradually reduced and when only 2 or 3 bars sloping downward to the left are obtained, the picture will pull into sync upon slight additional clockwise rotation of the control. Pull-in should occur before the control has been turned 70 degrees from the extreme counter-clockwise position. The picture should remain in sync for the balance of additional clockwise rotation of the control. At the extreme clockwise position, the picture should remain in sync and should not show a black bar in the picture.

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

ADJUSTMENT OF HORIZONTAL OSCILLATOR. — If in the above check the receiver failed to hold sync with the hold control at the extreme counter-clockwise position or failed to hold sync over the balance of clockwise rotation of the control from the pull-in point, it will be necessary to make the following adjustments.

Horizontal Frequency Adjustment. — Turn the horizontal hold control to the extreme clockwise position. Tune in a television station and adjust the horizontal frequency adjustment T119 (top), refer to figure 36, until the picture is just out of sync and the horizontal blanking appears as a vertical or diagonal black bar in the raster. Then turn the T119 core until the bar moves out of the picture leaving it in sync.

Horizontal Locking Range Adjustment. — set the horizontal hold control, R283B under front control cover, to the full counter-clockwise position. Momentarily remove the signal by switching off channel then back. The picture should fall out of sync with the diagonal lines sloping down to the left. Slowly turn the horizontal hold control clockwise and note the least number of diagonal bars obtained just before the picture pulls into sync.

If more than 2 bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C237 slightly clockwise. If less than 2 bars are present, adjust C237 slightly counter-clockwise. Turn the horizontal hold control counter-clockwise, momentarily remove the signal and recheck the number of bars present at the pull-in point. Repeat this procedure until 2 or 3 bars are present.

Repeat the adjustments under "Horizontal Frequency Adjustment" and "Horizontal Locking Range Adjustment" until the conditions specified under each are fulfilled. When the horizontal hold operates as outlined under "Check of Horizontal Oscillator Alignment" the oscillator is properly adjusted.

If it is impossible to sync the picture at this point and the AGC system is in proper adjustment it will be necessary to adjust the Horizontal Oscillator by the method outlined in the alignment procedure on page 17.

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

Adjust the vertical centering control R104 and the horizontal centering control R251 to center the picture within the mask of the kinescope. If the picture does not fully cover the masked area of the kinescope, adjust the positioning for equal distribution of blank area at top and bottom and at each side.

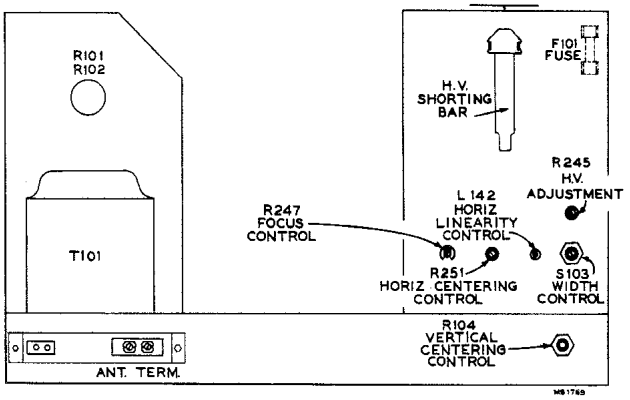


Figure 2—Rear Chassis Adjustments

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

Adjustment of the horizontal drive and linearity controls affect the operation of the HV section of the receiver and should not be attempted here.

If it is impossible to fill the mask by the above width adjustment, it will be necessary to follow the procedure outlined under HV ADJUSTMENT on page 17 of the "ALIGNMENT PROCEDURE."

HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS. — Adjust the height control R282A and the Vertical Linearity Control R282B (controls under cabinet front panel — see figure 1), until the picture or test pattern is symmetrical from top to bottom. Make the final adjustment to overscan the mask by one-half inch at both top and bottom. Recheck the horizontal and vertical centering for correct positioning of the picture with respect to the mask.

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

CHECK OF R-F OSCILLATOR ADJUSTMENTS. — Tune in all available UHF and VHF stations to see if the receiver r-f oscillator is adjusted to the proper frequency on all channels. Set the fine tuning control to the center of its range. Adjust the oscillator core for each channel to obtain maximum audio output without distortion. The location of the adjustment is the same for all channels (see figure 3).

The insert in the operating position can be determined by a stamping on the insert drum. This stamping is visible through the channel indicator apertures as shown in figure 3.

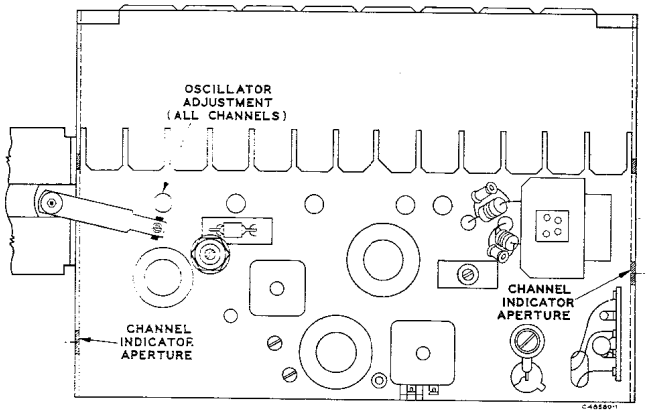


Figure 3—KRK12C Oscillator Adjustments

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 fastened to the antenna transmission line inside the receiver.

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

KINESCOPE REPLACEMENT

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

REMOVAL OF KINESCOPE. — Take off the front control knobs by pulling the knobs outward. Remove the rear metal screen of the cabinet and remove the cabinet top by taking out the four bolts holding the top in place. Slide the top to the rear approximately one-half inch and lift off. Disconnect the H.V. Ultor anode connector. Remove the yoke plug from the front of the high voltage compartment and unplug the speakers. Remove the power plug from the convergence chassis and disconnect the kinescope socket.

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

Remove the blue beam positioning magnet and the purifying magnet assembly by sliding them off the kinescope neck. Unfasten the ground lead between the yoke and the convergence coil assemblies. Loosen the three mounting thumb screws holding the convergence coil and magnet assembly to the kinescope and slide the assembly off the end of the kinescope neck. Refer to figure 7.

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

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

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

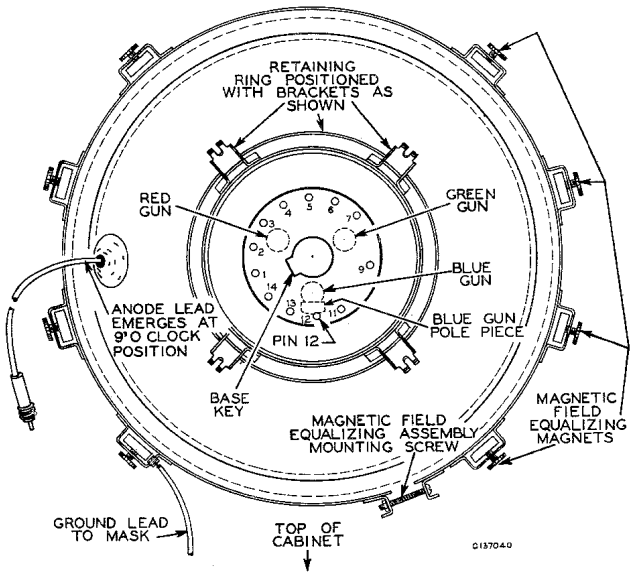


Figure 4—Kinescope Assembly

Check to be sure the ultor anode connector is seated where it passes through the aperture in the side of the H.V. Insulator. Install the insulator over the kinescope with the anode lead protruding at the "nine o'clock" position. The edge of the front mask should seat into the slot at the front of the insulator.

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

Slide the yoke and yoke shield assembly over the kinescope neck with the wing nuts at the sides. The yoke leads should be located at the bottom. Place the retaining ring over the yoke shield with the brackets positioned as shown in figure 4. Slip the retaining rods into the slots in the retaining ring and tighten just finger tight. The assembly should appear as shown in figure 5. The receiver may now be returned to an upright position.

Slide the convergence coil and magnet assembly forward over the kinescope neck. Center the magnets, from front to rear, over the pole pieces at the front end of the kinescope guns. The opening between the two magnets should be over the opening between the pole pieces. Tighten the three wing nuts equally to center the kinescope neck in the opening through the assembly plate. Refer to figure 6. Connect the ground lead to the assembly.

Insert the plugs in their respective sockets in the convergence chassis. For identification refer to figure 12. The plug, on the leads from the magnet positioned over the blue gun, should be inserted in the socket marked "B" on the convergence chassis. The same applies to green and red respectively. Placing the plugs in the improper sockets will

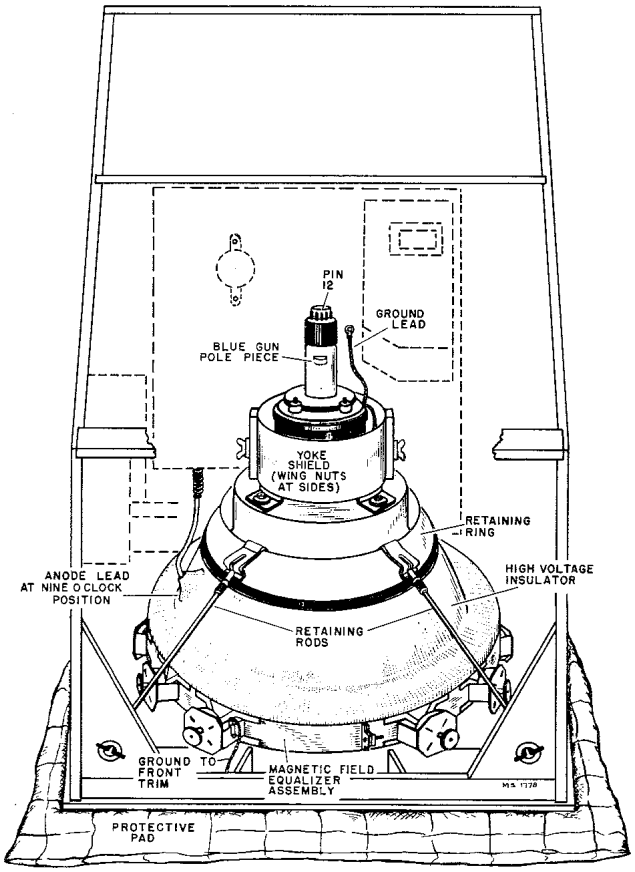


Figure 5—Kinescope Installation

result in inability to properly converge the kinescope beams. Place the purifying magnet over the kinescope neck with the small tabs toward the bell of the kinescope as shown in figure 7. Position the assembly approximately ¼ inch behind

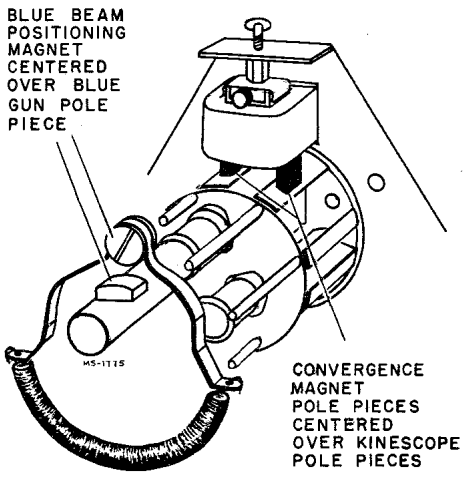


Figure 6—Location of Convergence and Blue Beam Positioning Magnets

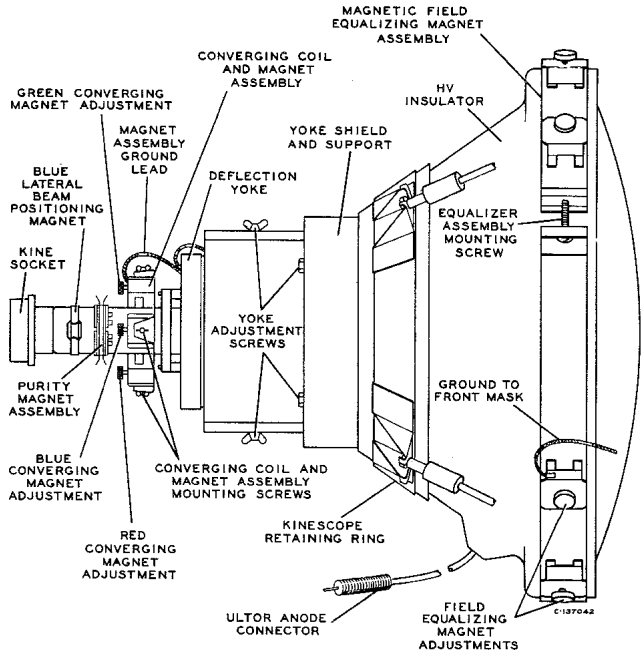


Figure 7—Kinescope Adjustments and Components

the converging coil and magnet assembly. Place the blue beam positioning magnet on the kinescope neck with the plastic insert directly over the blue beam positioning pole piece. See figure 6. Replace the chassis in the cabinet and bolt in position. Connect the ultor anode lead, the speaker plug, the convergence chassis power plug, the yoke plug and the kinescope socket.

COMPLETE SET-UP PROCEDURE

Prior to making any picture adjustments, it is essential to have 25,000 volts applied to the ultor anode of the kinescope (see HIGH VOLTAGE ADJUSTMENT under ALIGNMENT PROCEDURE on page 17). A conventional black and white test pattern, if available, is useful for making initial adjustments. A dot pattern should be provided for convergence adjustments.

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

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

If the receiver is overloading it will be necessary to adjust the AGC control.

Remove the metal control cover box and the cabinet panel below the cover box. To do this, remove the four knobs under the control cover by grasping each firmly to pull out. Remove the two round-head screws holding the cover box in place. Carefully slide the cover box assembly outward.

Grasp the top of the removable cabinet panel and slide up approximate one-half inch and remove the panel. The front service adjustments will now be accessible.

Turn the AGC control counter-clockwise until the receiver operates normally and the picture can be synchronized. (Refer to figure 1 for adjustment location.)

It should be noted here that only the adjustment of the AGC control should be made at this time.

Adjustment of the other controls accessible under the removable panel should be made only after an understanding of their functions has been acquired. The proper adjustment of each control is explained in later sections of this publication.

At this point it is necessary to adjust the horizontal oscillator and to make the conventional adjustments of height, vertical linearity, width, focus, and electrical centering if such adjustments are found necessary.

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

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

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

For generators with internal vertical sync omit this connection.

Connect the "ground lead" to the receiver chassis and the "output lead" to the Delay Line TD101, at the terminal board end near V115. CAUTION. — Do not short to chassis, this point is at +B potential.

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

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

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

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

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

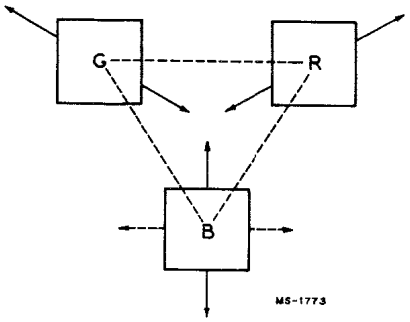


Figure 8—Dot Movement Pattern

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

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

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

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

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

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

VIDEO GAIN ADJUSTMENTS. — Advance the contrast control and tune in a normal black and white picture.

Adjust the blue and green video gain controls for a black and white picture free of any overall color cast.

Disregard any localized color fringing in the picture.

BACKGROUND ADJUSTMENTS. — Rotate the brightness control to produce a very dark picture on the screen.

Adjust the blue and green background controls for a uniform low-level black and white picture free of any color cast. Rotate the brightness control throughout the brightness range. The picture should remain black and white over the range of the brightness control.

Repeat the gain and background adjustments, if necessary, to achieve this condition.

STATIC CONVERGENCE ADJUSTMENTS

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

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

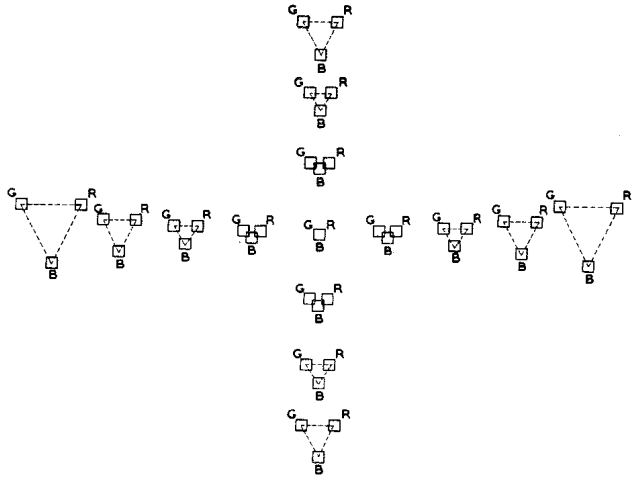


Figure 9—Center Static Convergence Pattern

DYNAMIC CONVERGENCE ADJUSTMENTS

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

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

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

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

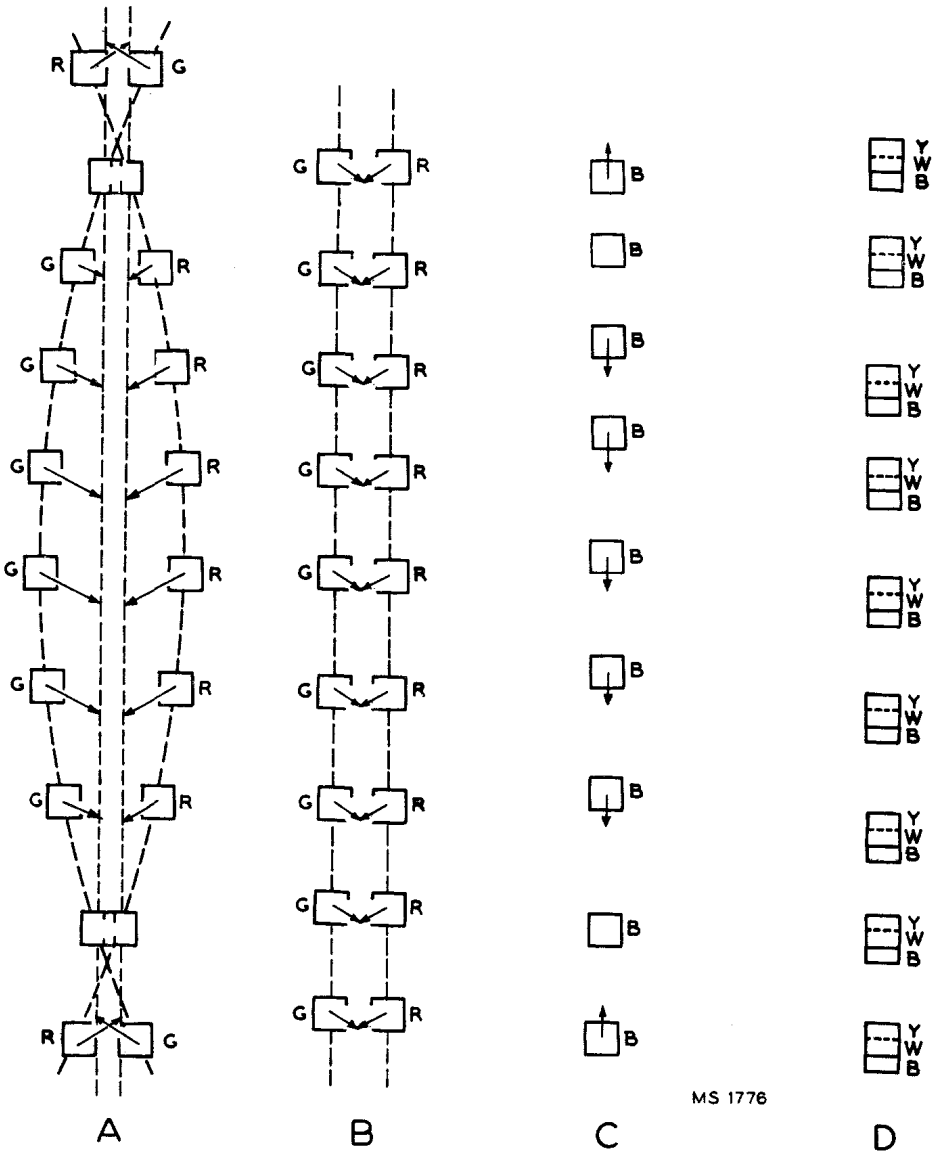


Figure 10—Vertical Dynamic Convergence Patterns

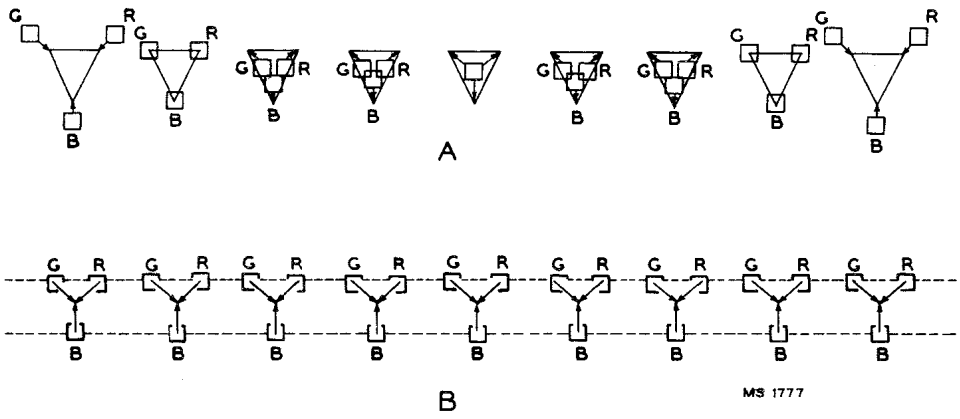


Figure 11—Horizontal Dynamic Convergence Patterns

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

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

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

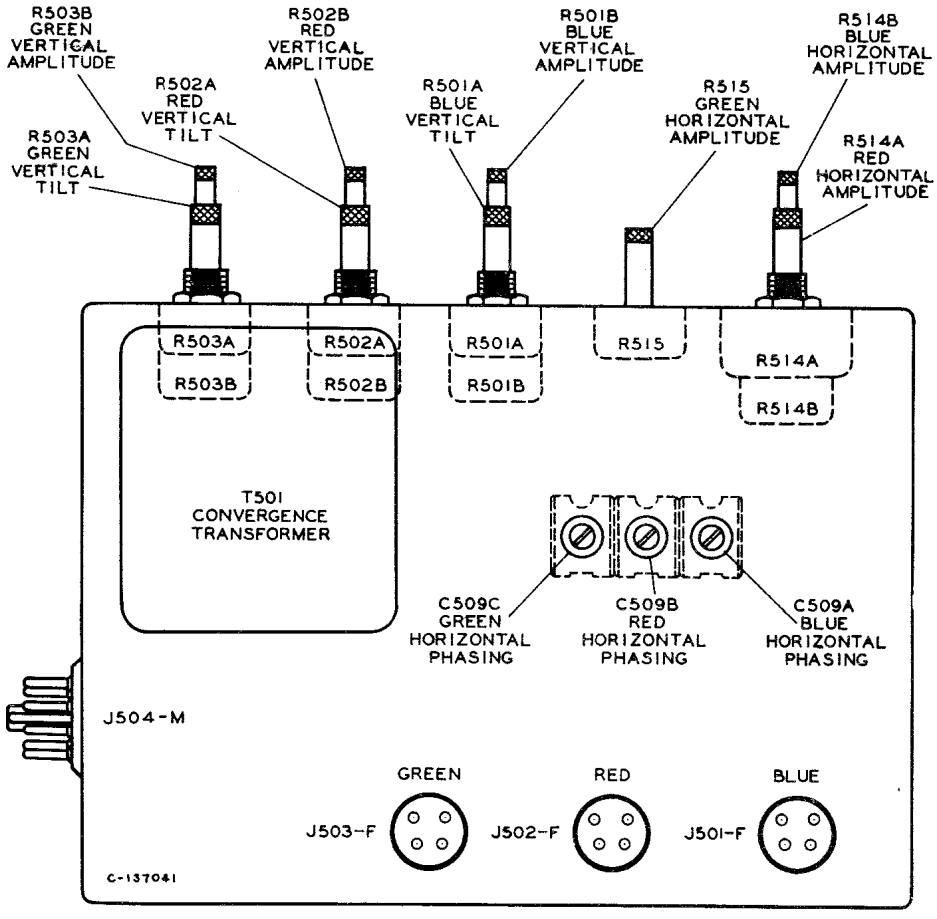


Figure 12—Convergence Chassis Showing Adjustments

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

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

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

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

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

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

Remove the metal trim and the safety glass.

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

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

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

The location should be chosen—

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

—To give easy access for operation and comfortable viewing.

—To permit convenient connection to the antenna.

—Convenient to an electrical outlet.

—To allow adequate ventilation.

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

VHF Sweep Generator meeting the following requirements:

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

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

(c) Output constant on all ranges.

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

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

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

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

(b) Radio frequencies

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

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

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

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

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

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

Channel Number	Picture Carrier Freq. Mc.	Sound Carrier Freq. Mc.	Receiver R-F Osc. Freq. Mc.
14	471.25	475.75	517
15	477.25	481.75	523
16	483.25	487.75	529
17	489.25	493.75	535
18	495.25	499.75	541
19	501.25	505.75	547
20	507.25	511.75	553
21	513.25	517.75	559
22	519.25	523.75	565
23	525.25	529.75	571
24	531.25	535.75	577
25	537.25	541.75	583
26	543.25	547.75	589
27	549.25	553.75	595
28	555.25	559.75	601
29	561.25	565.75	607
30	567.25	571.75	613
31	573.25	577.75	619
32	579.25	583.75	625
33	585.25	589.75	631
34	591.25	595.75	637
35	597.25	601.75	643
36	603.25	607.75	649
37	609.25	613.75	655
38	615.25	619.75	661
39	621.25	625.75	667
40	627.25	631.75	673
41	633.25	637.75	679
42	639.25	643.75	685
43	645.25	649.75	691
44	651.25	655.75	697
45	657.25	661.75	703
46	663.25	667.75	709
47	669.25	673.75	715
48	675.25	679.75	721
49	681.25	685.75	727
50	687.25	691.75	733
51	693.25	697.75	739
52	699.25	703.75	745
53	705.25	709.75	751
54	711.25	715.75	757
55	717.25	721.75	763
56	723.25	727.75	769
57	729.25	733.75	775
58	735.25	739.75	781
59	741.25	745.75	787
60	747.25	751.75	793
61	753.25	757.75	799
62	759.25	763.75	805
63	765.25	769.75	811
64	771.25	775.75	817
65	777.25	781.75	823
66	783.25	787.75	829
67	789.25	793.75	835
68	795.25	799.75	841
69	801.25	805.75	847
70	807.25	811.75	853
71	813.25	817.75	859
72	819.25	823.75	865
73	825.25	829.75	871
74	831.25	835.75	877
75	837.25	841.75	883
76	843.25	847.75	889
77	849.25	853.75	895
78	855.25	859.75	901
79	861.25	765.75	907
80	867.25	871.75	913
81	873.25	877.75	919
82	879.25	883.75	925
83	885.25	889.75	931

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

(Used with RCA WR-59C Generator)

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

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

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

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

I-F Load and Detector Block. — Refer to figure 18 under Alignment Procedure.

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

Sound Attenuator Pad. — Refer to figure 21 under Alignment Procedure.

Television Picture Carrier Signal Generator (with provision for Wide Band Modulation). — i.e. Crystal Diode Modulator and RCA WR-39C Crystal Calibrator.

Tuner Unit Input Head. — Refer to figure 17 under Alignment Procedure. This item is absolutely necessary for proper receiver alignment.

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

VHF Attenuator Pad. — Refer to figure 23 under Alignment Procedure.

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

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

SOUND I-F ALIGNMENT

Connect the VHF signal generator to terminal "C" of T102, the SOUND TAKE-OFF TRANSFORMER, and to ground. With a short jumper, ground the grid of the 5TH PICTURE I-F AMPLIFIER, pin 2 of V113.

Connect the "VoltOhmyst" to the junction of R118 and R120, near pin 2 of V103 RATIO DETECTOR, and to ground.

Set the signal generator to 4.5 mc. with maximum output and adjust T102 (top or bottom) and T103 (top or bottom), SOUND TAKE-OFF and SOUND I-F TRANSFORMERS, for maximum indication on the "VoltOhmyst."

Tune the primary of the RATIO DETECTOR TRANSFORMER T104 (top), for maximum DC output on the "VoltOhmyst." Adjust the signal level from the signal generator for —12 volts on the "VoltOhmyst" when finally peaked. This is approximately the operating level of the ratio detector for average signals.

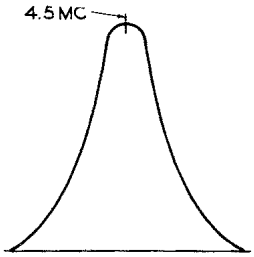


Figure 13
Sound IF
Response

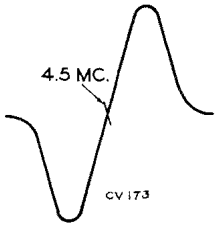


Figure 14
Ratio Det.
Response

Connect the "VoltOhmyst" to the junction of R119 and C120, ratio detector output, and to ground.

Tune T104 (bottom), ratio detector secondary, for zero DC on the "VoltOhmyst."

Repeat the adjustments of T104 (top) for maximum DC and T104 (bottom) for zero DC making final adjustment with the input from the signal generator adjusted to produce —12 volts on the "VoltOhmyst" at the junction of R118 and R120.

Connect a 1500 ohm resistor across terminals "B" and "C" the primary of T103 SOUND I-F TRANSFORMER, and using the same signal output from the generator readjust T103 (bottom) for maximum indication on the "VoltOhmyst." Change the 1500 loading resistor to terminals "A" and "D" of T103 and adjust T103 (top) for maximum indication on the meter.

Remove the resistor, signal generator and "VoltOhmyst" from the circuit. Remove the jumper at pin 2 of V113.

PICTURE I-F TRANSFORMER ALIGNMENT AND TRAP ADJUSTMENTS

Connect the oscilloscope in series with a preamplifier if required, to test point TP101 at the output of the picture second detector.

Connect the VHF signal generator to the grid of the 5TH PICTURE I-F AMPLIFIER, pin 2 of V113, and to ground. Modulate the signal generator to provide an indication on the oscilloscope.

With a short jumper, ground the grid of the 4TH PICTURE I-F AMPLIFIER, pin 8 of V112A.

Set the VHF signal generator to 47.25 mc. and tune T112 (top), 5TH PICTURE I-F PLATE TRANSFORMER, for minimum indication on the oscilloscope. (Refer to figure 36.)

Set the signal generator to 41.25 mc. and tune T113 (top), PICTURE SECOND DETECTOR TRANSFORMER, for minimum indication on the oscilloscope.

Disconnect the signal generator and the oscilloscope preamplifier, if used and reconnect the oscilloscope to TP101 without the preamplifier.

Connect the VHF sweep generator, using the shortest leads possible, to the grid of the 5th picture I-F amplifier, pin 2 of V113, and to ground. Set the sweep generator for maximum output or six (6) volts peak on the oscilloscope, whichever is the lowest.

Couple the signal generator loosely to the grid of the 5TH PICTURE I-F AMPLIFIER in order to obtain markers.

Adjust T112 (bottom), 5TH PICTURE I-F PLATE TRANSFORMER, (see figure 37), and T113 (bottom), PICTURE SECOND DETECTOR TRANSFORMER, for maximum gain and curve shape as shown in figure 15. While observing the curve shape on the oscilloscope, adjust R276, the SOUND REJECTION CONTROL at T113, for maximum rejection at 41.25 mc.

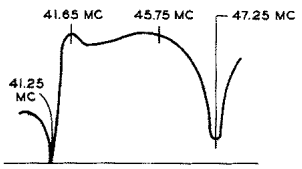


Figure 15
5th Picture
IF Response

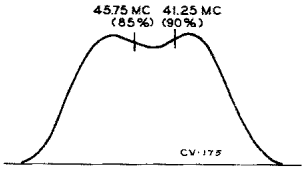


Figure 16
T1 and T10 Tuner
IF Response

Remove the sweep and signal generators, oscilloscope and the jumper shorting pin 8 of V112A.

The balance of the picture I-F adjustments will be performed with the sweep or signal generators connected to the front terminal of CR1, the K3E crystal mixer, of the KRK12C tuner. Extremely short leads must be employed in connecting to the crystal mixer and in grounding to the tuner case in order to obtain reliable response curves. An "Input Head" has been designed for this purpose and should be employed to achieve proper alignment of the receiver. This "Input Head" is shown in figure 17.

Connect the signal generator to the front terminal of the crystal mixer, CR1, employing the "Input Head" mentioned above.

Obtain three 7.5 volt batteries capable of withstanding appreciable current drain and connect two of the batteries in series making a 15 volt bias supply. Connect the ends of a 1000 ohm potentiometer across the battery combination. Connect a second potentiometer across the ends of the single 7.5 volt battery. Connect the positive terminal of the 7.5 volt bias box to the chassis and the potentiometer arm to the junction of R178 and C169 (at T109 — 3rd pix I-F transformer). Adjust bias box for —6 volts DC at the junction point.

With a short jumper ground the junction of R134 and R388 in the plate circuit of V117A, the AGC amplifier.

Connect the "VoltOhmyst" between test point TP101 and terminal "E" of T113, the PICTURE 2ND DETECTOR TRANSFORMER.

Set the signal generator to each of the following frequencies and peak the specified adjustment for maximum indication on the "VoltOhmyst," reduce the generator output if necessary to maintain a —6 volt level on the "VoltOhmyst," with —6 volts of I-F bias at the junction of R178 and C169.

44.9 mc.	T109 (top)
42.1 mc.	T110 (top)
41.3 mc.	T111 (top)

Remove the signal generator, "VoltOhmyst" and the bias box used to provide bias for alignment.

Connect the VHF sweep generator to the front terminal of the crystal mixer CR1, employing the "Input Head" as before. Clip a 56 ohm composition resistor between terminals "C" and "D" of T2, the I-F TRANSFORMER on the KRK12C tuner.

Connect the "Detector" lead from the "I-F Test Block" shown in figure 18, to test point TP2 on top of the tuner. Connect the oscilloscope to the "Oscilloscope" terminals on the "I-F Test Block."

Couple the VHF signal generator loosely to the grid of the 1st picture I-F Amplifier in order to obtain markers.

Adjust T10, primary and secondary, for maximum gain and curve shape as shown in figure 16. Use .3 volts peak to peak on the oscilloscope during adjustment.

Remove the 56 ohm load resistor, "I-F Test Block," oscilloscope and the sweep and signal generators.

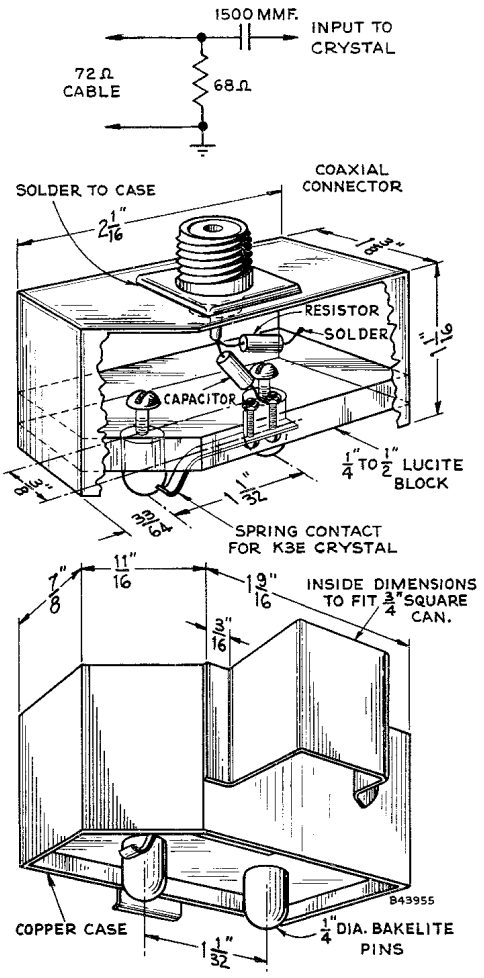


Figure 17—KRK12C Input Head

Connect the load leads from the "I-F Test Block" to pin 5 of V110 and pin 5 of V111, plates of the second and third picture I-F amplifiers.

Ground the I-F AGC buss at the junction of R178 and C169, at T109, 3rd picture I-F transformer.

Connect the "Detector" lead from the "I-F Test Block" to the plate of the first picture I-F amplifier, pin 5 of V109 and the oscilloscope, through the preamplifier if required, to the "Oscilloscope" terminals of the "I-F Test Block." (Refer to figure 18.)

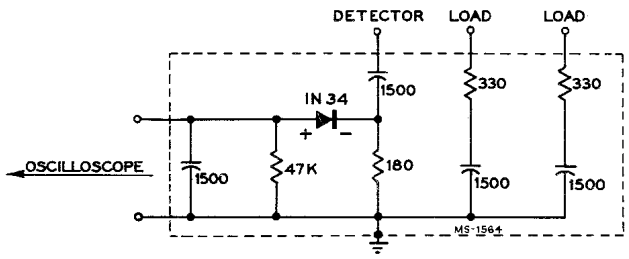


Figure 18—IF Test Block

Connect the VHF signal generator, using the "Input Head," to the front terminal of the crystal mixer CR1. Set the signal generator to 41.25 mc. and modulate the generator for indication on the oscilloscope.

Adjust T106 (top), 1ST PICTURE I-F GRID TRANSFORMER, for minimum response on the oscilloscope at 41.25 mc.

Remove the VHF signal generator and connect the VHF sweep generator, using the "Input Head," to CR1.

Remove the oscilloscope and the preamplifier from the "I-F Test Block" and reconnect the oscilloscope, without the preamplifier, to the "Oscilloscope" terminals of the "I-F Test Block." Couple the VHF signal generator loosely to 1st picture I-F amplifier grid in order to obtain markers.

Adjust T106 (bottom), 1ST PICTURE I-F GRID TRANSFORMER, and T2, I-F TRANSFORMER on the KRK12C tuner, for maximum gain and curve shape as shown in figure 19. Use .3 volts peak-to-peak on the oscilloscope. While observing the response on the oscilloscope, set R166, the SOUND LEVEL CONTROL located at terminal "D" of T106, for maximum rejection at 41.25 mc. See figure 19.

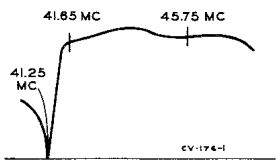


Figure 19—T2 and T106 Response from CR1

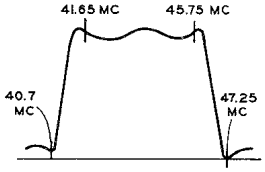


Figure 20—T107 and T108 Response from CR1

Disconnect the "Detector" lead of the "I-F Test Block" from pin 5 of V109 and reconnect it to pin 5 of V110, 2ND PICTURE I-F AMPLIFIER.

Connect the "Load" leads from the "I-F Test Block" to pin 5 of V111 and pin 6 of V112A, plates of the 3rd and 4th picture I-F amplifiers. Leave the oscilloscope connected to the "Oscilloscope" terminals of the "I-F Test Block." Connect the signal generator to CR1.

Adjust T107 (top), 1ST PICTURE I-F PLATE TRANSFORMER, for minimum response at 40.7 mc. Adjust T108 (top), 2ND PICTURE I-F GRID TRANSFORMER, for minimum response at 47.25 mc.

Remove the jumper from the junction of R178 and C169 and connect the negative terminal of the 15 volt bias box to this point. Adjust the bias potentiometer to read —6 volts DC at the junction of R178 and C169.

Remove the signal generator from CR1, and connect the sweep generator to CR1 using the "Input Head." Remove the oscilloscope preamplifier and reconnect the oscilloscope directly to the "Oscilloscope" terminals of the "I-F Test Block."

Couple the signal generator loosely to the 1st picture I-F amplifier grid in order to obtain markers.

Adjust T107 (bottom), 1ST PICTURE I-F PLATE TRANSFORMER, and T108 (bottom), 2ND PICTURE I-F GRID TRANSFORMER, for maximum gain and curve shape as shown in figure 20.

Disconnect the VHF signal generator and the VHF sweep generator. Insert the preamplifier, if needed with the oscilloscope used, in series with the oscilloscope connected to the "I-F Test Block."

Connect the sound attenuator pad, shown in figure 21, in series with the VHF signal generator to the front terminal of CR1, using the "Input Head." Use internal modulation of the VHF signal generator and set the generator to 43.0 mc. Note the output level on the oscilloscope at 43.0 mc. Remove the attenuator pad and reconnect the signal generator to CR1. Set the signal generator to 41.25 mc. and readjust T106 (top) for minimum response.

Turn R166, SOUND LEVEL CONTROL, counter-clockwise from its maximum attenuation position just obtained, to achieve the same output indication on the oscilloscope as that obtained previously at 43.0 mc. with the attenuator pad.

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

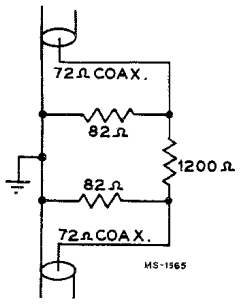


Figure 21—Sound Attenuator Pad

OVER-ALL I-F ALIGNMENT

Change the I-F bias at the junction of R178 and C169 to read —9 volts DC on the "VoltOhymst."

Connect the oscilloscope to test point TP101, at picture second detector output, and calibrate the oscilloscope to read 6 volts peak to peak.

Connect the sweep generator, using the "Input Head," to the front terminal of the crystal mixer CR1.

Couple the signal generator loosely to 1st picture I-F amplifier grid in order to obtain markers.

Retouch T109, T110 and T111, 3rd, 4th and 5th picture I-F transformers, for maximum gain and overall curve shape as shown in figure 22. It is important that the overall response conforms to curve shape as shown, with the markers placed exactly as indicated.

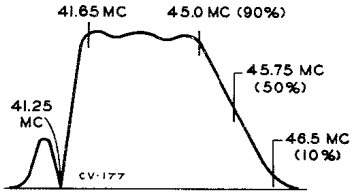


Figure 22—Overall IF Response

KRK12C TUNER ALIGNMENT

TUNER VHF ALIGNMENT — Connect the VHF sweep generator to the antenna terminals. In order to prevent coupling reaction from the sweep generator, it is advisable to employ a resistance pad between the antenna terminals and the generator. Figure 23 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 generator employed.

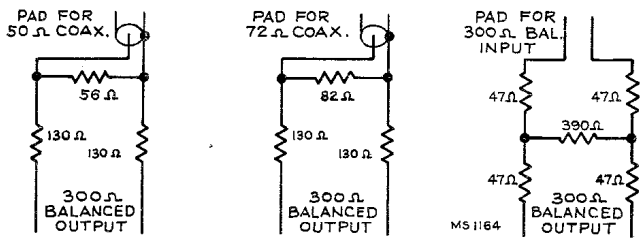


Figure 23—Sweep Attenuator Pads

Couple the VHF signal generator loosely to the antenna terminals. Connect the oscilloscope through the preamplifier, if needed with oscilloscope used, to test point TP1. Connect the potentiometer arm of the 7.5 volt bias supply to the AGC terminal on the tuner and ground the battery positive terminal to the tuner case. Adjust the bias potentiometer to produce —2.0 volts of bias as measured by the "VoltOhmyst" at the AGC terminal on the tuner. Remove V2, R-F oscillator tube, from its socket. This is required because of R-F - I-F interaction when a crystal is used as a mixer.

Set the channel selector and the sweep generator to channel 2.

Insert markers of channel 2 picture carrier and sound carrier, 55.25 mc. and 59.75 mc.

Adjust antenna T6, r-f amplifier plate L29 and mixer L30 adjustments for a symmetrical curve with maximum gain at the center of the pass band. The curves will have a deep valley because of no crystal loading and nonlinear detector characteristics. The limits for the 100% response points are shown in figure 24. The proper curve shape is shown in figure 24(b). (Refer to note on page 19 for detailed explanation of adjustments.) If the bandwidth is out of tolerance, it can usually be corrected by redressing the coupling capacitor of the double tuned circuit, C40 on insert A. Maximum bandwidth occurs when the capacitor is centered in the insert chamber.

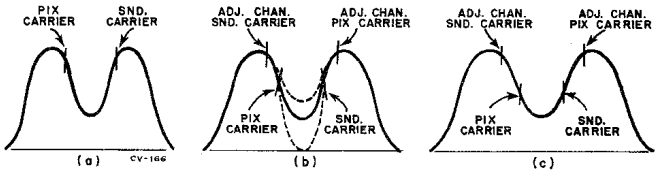


Figure 24—KRK12C VHF Insert Response

Repeat the above steps for all VHF channels adjusting the appropriate antenna, r-f amplifier plate and mixer slugs for a symmetrical curve with maximum gain at the center of the pass band.

Turn off the sweep generator.

Remove the oscilloscope and preamplifier if used, from test point TP1.

Replace the RF oscillator tube V2 in its socket.

Connect the potentiometer arm of the 15 volt bias supply to the junction of R178 and C169, and ground the positive battery terminal. Adjust the bias potentiometer to produce —9 volts of I-F bias as indicated on the "VoltOhymst" at the junction point.

Connect the oscilloscope to TP101. Use 6 volts peak-to-peak output on the oscilloscope.

Turn the channel selector to channel 13.

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

Adjust the oscillator slug L22 to proper frequency, 257 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 257 mc (or to one-fourth the oscillator frequency, 64.25 mc) with crystal accuracy. Insert one end of a piece of insulated wire into the tuner through either of the two holes next to the oscillator tube on the right front top corner of the tuner. Be careful that the wire does not touch any of the tuned circuits as it may cause the frequency of the oscillator to shift. Connect the other end of the wire to the "r-f in" terminal of the signal generator. Adjust L22 oscillator slug to obtain an audio beat with the signal generator.

Turn on the sweep generator and set to channel 13. Adjust T1 for maximum gain on the oscilloscope. Adjust mixer tank circuit L21 for maximum gain and flat-topped curve. Recheck T1 for maximum gain at center of band with the proper response. Maximum gain and flat-topped response should be obtained simultaneously.

Adjust the oscillator to frequency on all VHF channels by switching the receiver and signal generator to each VHF channel and adjusting the appropriate oscillator slug to obtain an audio beat with the signal generator. Adjust the appropriate mixer slug where necessary to obtain maximum gain and proper curve shape as explained above. Do not readjust T1.

Adjust the tunable I-F Trap C16-L7. To do this connect the signal generator to the fixed I-F Trap C2-L2 at the end opposite the antenna terminal plug. Set the signal generator to 43.5 mc and adjust the output of the signal generator to obtain sufficient indication on the oscilloscope. Tune the I-F Trap C-16-L7 for minimum indication on the oscilloscope.

Remove the signal generator and the oscilloscope.

TUNER UHF ALIGNMENT. — To align the UHF inserts:

Remove the R-F oscillator tube V2 from its socket.

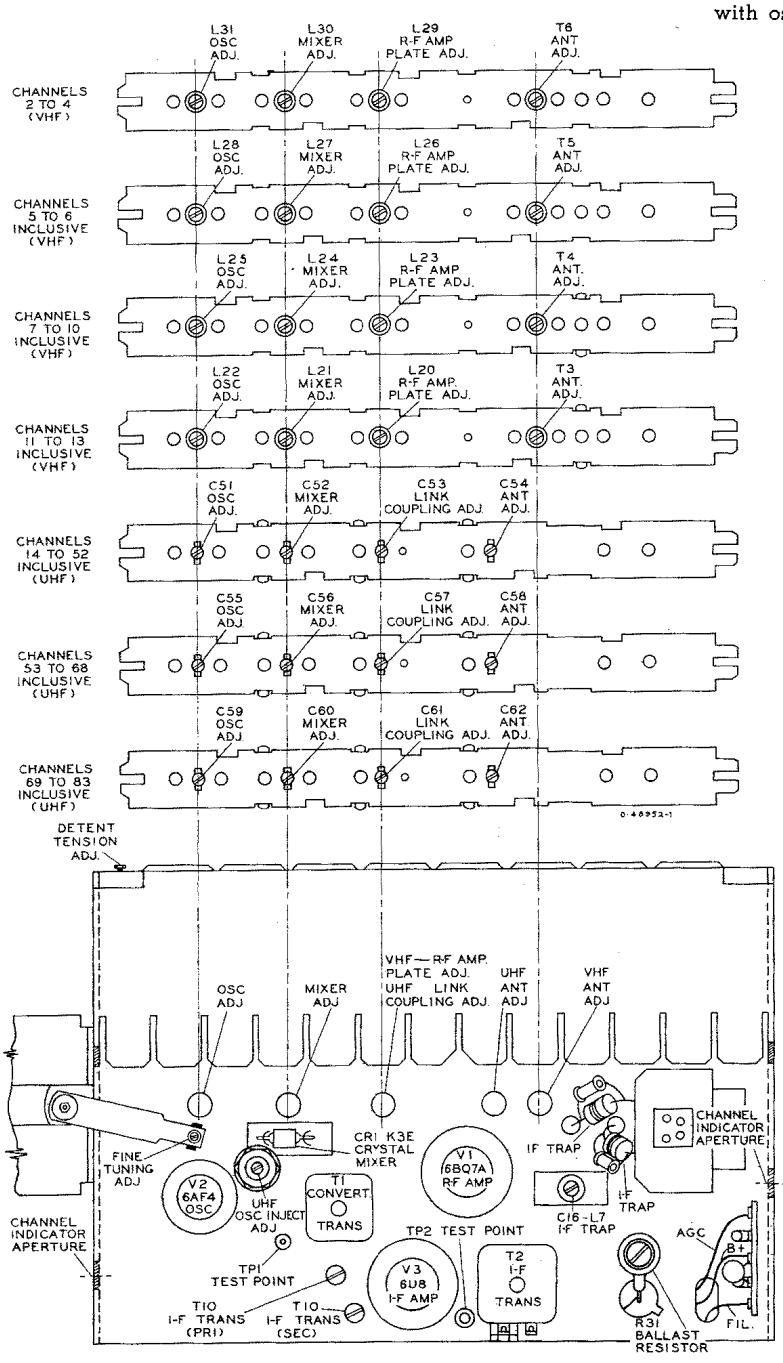


Figure 25—KRK12C Tuner Adjustments

Connect the potentiometer arm of the 15 volt bias supply to the junction point of R178 and C169, and ground the positive battery terminal. Adjust the bias potentiometer to produce —9 volts of I-F bias as indicated on the "Volt-Ohmyst" at the junction point.

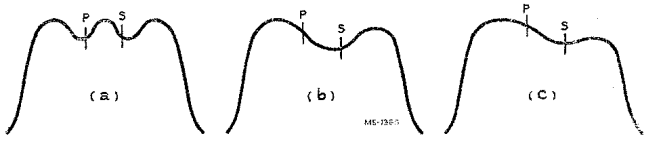


Figure 26—KRK12C UHF Insert Responses

Connect the oscilloscope, through the preamplifier if needed with oscilloscope used, to test point TP1.

Connect the UHF sweep generator to the antenna terminals. Use a 10DB attenuator pad to assure proper alignment.

Connect the UHF signal generator loosely to the antenna terminals.

Set the channel selector to the desired channel and the sweep generator to sweep the frequency of the insert being used.

Insert markers of the picture carrier and sound carrier frequencies for the desired channel (see Table on page 11).

Adjust the UHF antenna, link coupling and mixer adjustments for a symmetrical curve, with maximum gain centered about the pass band.

The responses are shown in figure 26. The curve shape will usually vary from figure 26(a) to figure 26(c) going higher in frequency; however any of these responses are acceptable.

Repeat the above steps for all UHF inserts used, adjusting the appropriate antenna, link coupling and mixer slugs for a symmetrical curve with maximum gain centered about the pass band.

Remove the oscilloscope and preamplifier, if used from test point TP1.

Replace the R-F oscillator tube V2 in its socket.

Connect the oscilloscope to test point TP101. Use 6 volts peak-to-peak on the oscilloscope.

Turn the channel selector to the lowest UHF channel to be used, and set the fine tuning control to the center of its range.

Adjust the oscillator core to proper frequency. To do this, connect the VHF signal generator to test point TP1 with the shortest leads possible. Insert a 45.75 mc marker from the VHF generator.

Set the UHF sweep generator to sweep the desired channel, and observe the output on the oscilloscope. If the sweep generator is not sweeping the correct frequency range, it may be necessary to readjust the sweep in order to place the 45.75 mc marker on the response curve as in figure 22.

Set the UHF marker generator to the picture carrier of the channel insert being adjusted and connect to test point TP1.

Adjust the oscillator core until the markers for 45.75 mc and the picture carrier coincide on the sweep pattern on the oscilloscope.

Adjust the mixer core for maximum gain with proper wave shape.

Connect the "VoltOhmyst" to test point TP1, using 1.5 volt DC scale.

Set the oscillator injection adjustment to read .1 volt on the "VoltOhmyst."

Repeat the above steps for all UHF inserts adjusting the oscillator injection control only if the reading on the "VoltOhmyst" exceeds .3 volts. Adjust as necessary to read .3 volts or less at TP1.

Remove all the test equipment employed for tuner alignment.

VIDEO TRAP ADJUSTMENT

Short the grid, pin 2 of V113, 5TH PICTURE I-F AMPLIFIER, with a short jumper to ground.

Ground the junction of R310 and C259, in the plate circuit of V112B Killer, with a short jumper.

Connect the VHF signal generator to the grid of the 1st Video Amplifier, pin 2 of V114, and set the generator to 4.5 mc with internal modulation of the generator.

Connect the oscilloscope, using the oscilloscope diode probe, to the junction of C265, L121 at the top of R317 (COLOR control).

Turn the ganged contrast control R204/R210 to the maximum clockwise position.

Adjust L108, the 4.5 mc trap in the cathode circuit of V114, 1st Video Amplifier, for minimum 4.5 mc indication on the oscilloscope.

Remove the two jumpers, the oscilloscope and the signal generator.

(100% Saturated Color Bar Signal Being Used)

Connect the wide band oscilloscope to the kinescope grids at the terminals on the rear of the chassis and adjust L140, the 3.58 mc trap for minimum color sub-carrier indication in the video signal.

(Method without 100% Saturated Color Bar Signal and Wide Band Oscilloscope)

Ground the grid; pin 2 of V113, the 5th Picture I-F Amplifier, at the tube socket. This will prevent noise from the second detector appearing on the oscilloscope presentations to be observed.

Connect the sweep generator, in series with the absorption type video marker box and a .1 mfd capacitor, to the grid of the 1st Video Amplifier. Set for Video Sweep; i.e., 0-5 mc.

Connect the oscilloscope, using the diode probe, to the junction of L112, R216 and R224 (plate circuit of V115A — 2nd Video Amplifier) at the peaking coil L112.

Turn the Contrast control fully clockwise.

Increase the sweep output to raise the 3.58 mc portion of the trace on the oscilloscope above the base line.

Adjust L140, the 3.58 mc trap to coincide with the 3.58 mc marker from the marker box. See figure 27.

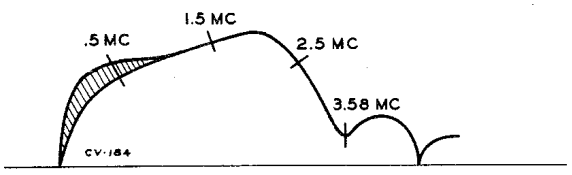


Figure 27—3.58 MC Trap Adjustment

At this point it is advisable to check for proper overall response to kinescope grids and "R-Y" and "Q" channel responses. (*Although* these circuits are not adjustable their proper operation can be determined by observing their responses.)

Disable the 3.58 mc oscillator, V131 B, by removing Y101, the 3.58 mc crystal.

Turn the Color control fully counter-clockwise.

Connect the oscilloscope, using the diode probe, to each of the kinescope grids and check the response. Reduce the output of the sweep generator to prevent *over load.* The response should correspond to the curve shown in figure 28.

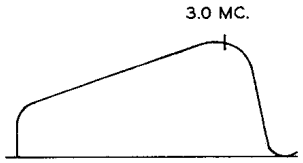


Figure 28—Overall Response at Kinescope Grids

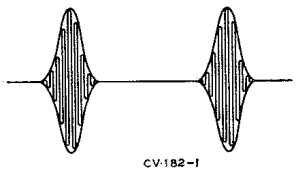


Figure 29—Burst

Move the oscilloscope and diode probe to the test point TP103 at the "R-Y" Phase Splitter cathode.

Connect the sweep generator to the "R-Y" Demodulator grid, pin 1 of V132.

Turn the Color control fully clockwise.

Check the "R-Y" channel response for proper wave shape as shown in figure 30.

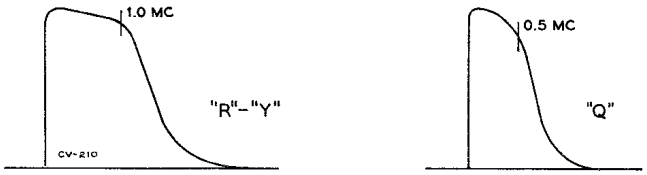


Figure 30—"R-Y" and "Q" Channel Responses

Connect the sweep generator to the "Q" Demodulator grid, pin 1 of V133, and move the oscilloscope and diode probe to test point TP102, at the "Q" Phase Splitter cathode. Check the "Q" channel response as shown in figure 30.

Replace Y101, the 3.58 mc crystal. Remove the sweep generator and marker box and the oscilloscope and diode probe.

IST VIDEO AMPLIFIER AND BAND PASS AMPLIFIER ALIGNMENT

Remove the FIFTH PICTURE I-F AMPLIFIER tube V113, or short the grid of V113 to ground. Connect the VHF sweep generator to pin 2 of V114, in series with the absorption marker box and a .1 mfd capacitor. Connect the capacitor to the grid of the Video Amplifier. Set the generator for Video Sweep; i.e. 0-5 mc. Connect the oscilloscope, using diode probe, to pin 1 of V133, grid of the "Q" Demodulator.

Turn the Contrast control R204/R210 and the Color control R317 to their maximum clockwise position.

Adjust the Band Pass Transformer T126 (top and bottom) and L121 (top) the Band Pass Secondary Coil, for maximum gain and curve shape as shown in figure 32.

Remove all test equipment. Replace V113 or remove the short on the grid. *Turn off the receiver.* Replace the fuse F101.

(Alternate Method using Television Picture Carrier Signal Generator — with Modulation)

Set the channel selector to channel 4.

Connect the potentiometer arm of the 7.5 volt bias supply to the junction of R132 and C128, at pins 5 and 6 of V104 1st Audio Amplifier and R-F Bias clamp, and ground the positive terminal of the bias supply to the chassis. Set the potentiometer to read —2.0 volts DC on the "VoltOhymst" at the junction of R132 and C128.

Connect the potentiometer arm of the 15 volt bias supply to the I-F bias buss at the junction of R178 and C169, and ground the positive terminal of the bias supply to the chassis. Set the potentiometer to read —9.0 volts DC on the "VoltOhmyst" at the junction of R178 and C169.

Short the terminals of L108, the 4.5 mc trap in the cathode circuit of V114, to each other.

Connect the oscilloscope, using the oscilloscope diode probe, to pin 1 of V114, the 1st Video Amplifier.

Connect the generator and modulator to the antenna terminals and set to channel 4. With zero modulation, adjust the output for 3 volts on the "VoltOhmyst" between test point TP101, and terminal "E" of T113, the second detector transformer.

Modulate with video sweep being careful not to overload.

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

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

Remove the marker generator from 1st pix I-F Amplifier grid.

The response on the oscilloscope should correspond to that shown in figure 31.

Disconnect the oscilloscope and diode probe from pin 1 of V114 and reconnect the oscilloscope, using the diode probe, to pin 2 of V133, the "Q" Demodulator.

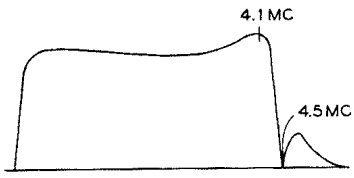


Figure 31
Overall Response
1st Video

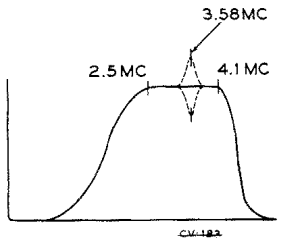


Figure 32
Overall Band Pass
Response

Remove the short across L108 the 4.5 mc. trap, at pin 1 of V114.

With a short jumper, ground the junction of R310 and C259 in the plate circuit of the killer V112B.

Turn the ganged contrast control R204/R210, to its maximum clockwise position.

Adjust T126 (top and bottom) the Band Pass Transformer and L121 (top), the Band Pass Secondary Coil, for maximum gain and curve shape as shown in figure 32.

NOTE: When using a video sweep generator without internal markers, the VHF signal generator may be employed by loosely coupling to the I-F Amplifier and inserting the appropriate I-F markers.

Remove the test equipment employed in the preceding adjustments. *Turn off the receiver* and replace the fuse F101.

HORIZONTAL OSCILLATOR ALIGNMENT

NOTE: *The shorting bars on the rear and inside the high voltage compartment must be held open to perform these adjustments.*

The proper functioning of those circuits employing horizontal pulse voltages in their operation, are dependent on the alignment of the Horizontal Oscillator (and Horizontal Deflection) circuit. Also, proper alignment of these circuits, establishes the proper DC current drain for the receiver. Therefore, care should be taken to assure correct circuit adjustment as outlined below.

Tune in a station and synchronize the picture with the horizontal hold control R283B.

Preset the horizontal drive control R250, on top of the receiver chassis, to the center of its range. Set the horizontal locking range trimmer C237, on top of the receiver chassis, one-quarter turn from full clockwise. Set the width switch S103, on the rear of the H.V. compartment, to its center position.

Set the horizontal linearity adjustment L142 clockwise for maximum inductance.

Set the horizontal hold control R283B at the center of its range.

Adjust the horizontal frequency core T119 (top), if necessary, to bring the picture into sync horizontally.

Connect the oscilloscope to terminal "C" of T119 under the chassis. Adjust waveform T119 (bottom) for proper wave shape as shown in figure 33.

Adjust the waveform adjustment core of T119 until the two peaks are at the same height. During this adjustment, the picture must be kept in sync by readjusting the hold control if necessary.

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 over-stabilized, 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.

Set the horizontal hold control to the full counter-clockwise position. Momentarily remove the signal by switching off channel then back. The picture may remain in sync. If so turn the frequency core of T119 (top) slightly and momentarily switch off channel. Repeat until the picture falls out of sync with the diagonal lines sloping down to the left. Slowly turn the horizontal hold control clockwise and note the least number of diagonal bars obtained just before the picture pulls into sync.

If more than 3 bars are present just before the picture pulls into sync. adjust the horizontal locking range trimmer C237 slightly clockwise. If less than 2 bars are present, adjust C237 slightly counter-clockwise. Turn the horizontal hold control counter-clockwise, momentarily remove the signal and recheck the number of bars present at the pull-in point (70° clockwise rotation). Repeat this procedure until 2 or 3 bars are present.

Turn the horizontal hold control to the maximum clockwise position. Adjust the frequency core T119 (top) so that the diagonal bar sloping down to the right appears on the screen and then reverse the direction of adjustment so that bar just moves off the screen leaving the picture in synchronization.

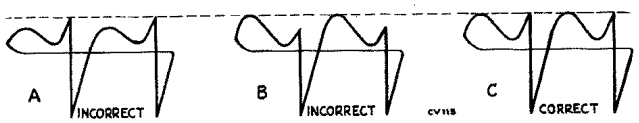


Figure 33—Horizontal Oscillator Waveforms

H.V. ADJUSTMENT

Turn both the ganged Contrast control R204/R210 and the Brightness control R124A fully counter-clockwise.

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

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

Ajust the horizontal drive control R250 and the horizontal linearity adjustment for minimum reading on the meter.

Reading the voltage at the corona cup of V121 with the high voltage probe, adjust the HV adjustment R245 for a 25 KV reading on the "VoltOhmyst."

Re-check the operation of the horizontal hold control (R283B) to assure that the operation is still proper as previously determined by horizontal oscillator adjustment.

NOTE: To check the performance of the HV circuit, a reading may be taken of V124 the 6BK4 regulator current. Insert a meter in the cathode circuit of the 6BK4. A reading of at least 700 microamperes should be obtained with 25 KV of Ultor Anode voltage.

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

Adjust the height (R282A) and the vertical linearity (R282B) for vertical linearity of the picture making the final adjustments to provide vertical overscan of the viewing area by one-half inch at top and bottom.

Remove all test equipment used in the preceding adjustments.

COLOR AFC ALIGNMENT

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

Connect the Color Bar Generator to the receiver antenna terminals.

Connect the "VoltOhmyst" in series with a calibrated RF Probe (or the Wide Band Oscilloscope) to terminal "B" of T128, the 3.58 mc oscillator transformer.

Adjust T128 (top) to read 5 volts peak-to-peak on the "VoltOhmyst" or the oscilloscope.

Ground the grid of the burst amplifier, pin 8 or V129A, with a short jumper.

Connect the "VoltOhmyst" to pin 3 of the phase detector V130B.

Adjust the 3.58 mc C.W. transformer T125 (bottom), for maximum DC reading on the "VoltOhmyst," then adjust T125 (top) for minimum DC reading on the "VoltOhmyst."

Remove the jumper shorting the grid (pin 8) of the burst amplifier V129A and set the HUE control to the center of its range.

Connect the "VoltOhmyst" to pins 1-2 of the phase detector V130B.

Adjust L141 (top) and the burst amplifier transformer T122 (bottom) for maximum DC on the "VoltOhmyst." The burst amplifier transformer T122 will tune very broadly and seem to have a flat top. Adjust T122 for the maximum reading at the approximate center of the flat top.

NOTE: The Burst signal should be observed at this point. To do this, connect the wideband oscilloscope to pins 1-2 of the phase detector V130B. Check the burst signal, it should conform to figure 29. The burst signal should not change shape when rotating the horizontal hold control over its holding range. Remove the oscilloscope.

Ground the junction of L130, R340 and C275 (in the grid circuit of V131A reactance tube).

Connect the "VoltOhmyst" to pins 1-2 of V130B phase detector and carefully adjust T124 (top), Reactance Transformer, for zero beat on the output, which may be observed by a slow swing of the "VoltOhmyst." (Observation may also be made on an oscilloscope or on the kinescope face.)

Remove the short to ground at the junction of L130, R340 and C275 and connect the "VoltOhmyst" to this point.

Shunt the 3.58 mc crystal Y101 with a 15 mmf capacitor.

Adjust the AFC Balance Control R306 on top of the receiver chassis for zero reading on the "VoltOhmyst".

Remove the 15 mmf capacitor shunting the crystal Y101 and disconnect the "VoltOhmyst."

MATRIX ALIGNMENT

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

Depress the "BRIGHTNESS MOD." button. The reading should increase to —1.85 volts. Turn the metering switch to "off."

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

Adjust the Fine Tuning control until the picture on the kinescope shows no sound interference. Advance the Color control R317, until color appears in the bar pattern. If the width control is properly adjusted (as explained in Installation Instructions) 10 color bars will be seen on the kinescope.

The normal sequence of the ten bars visible on the Kinescope, starting from the left side, should be as follows. At the extreme left a dull yellow-orange bar, orange, then a bright red, bluish-red, magenta, blue, greenish-blue, cyan, bright bluish-green and ending with a dark green bar at the extreme right.

Connect the oscilloscope to test point TP103, "R-Y" Phase Splitter cathode, the signal on the oscilloscope will be the +"R-Y" signal. (See figure 34.)

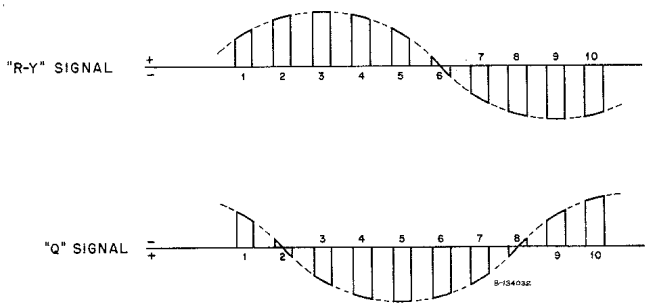


Figure 34—"R-Y" and "Q" Waveforms

Set the Hue control, C186, to the center of its range, capacitor plates halfway meshed. Then adjust L141 until the 6th bar from "Burst" is at the zero axis.

Connect the oscilloscope to TP102, "Q" Phase Splitter cathode, and check the pattern. This will be the —"Q" signal on the oscilloscope. The 2nd and 8th bars from burst should be at the zero axis. If not, adjust T125 (top) 3.58 mc C.W. Transformer, to bring the 2nd and 8th bars to the zero axis. Recheck the "R-Y" signal and readjust if necessary.

Connect the oscilloscope to the blue kinescope grid, pin 12, at the terminal at the rear of the chassis. (See figure 36.) Adjust the Color control to make the maximum amplitude bar the same amplitude as the sync pulse (in the opposite polarity).

Adjust the "R-Y" Gain control until the 3rd and 9th bars are at the zero axis. (Refer to figure 35.)

Move the oscilloscope to the red kinescope grid, pin 2, at the terminal at the chassis rear. The pattern on the oscilloscope should show the 3rd and 9th bars to be approximately one-half the height of the sync pulse, the 6th bar should be on the zero axis.

Move the oscilloscope to the green kinescope grid, pin 6, at the terminal at the chassis rear. The pattern should show the 4th and 10th bars to be approximately one-third the height of the sync pulse, and the 1st and 7th bars should be at the zero axis.

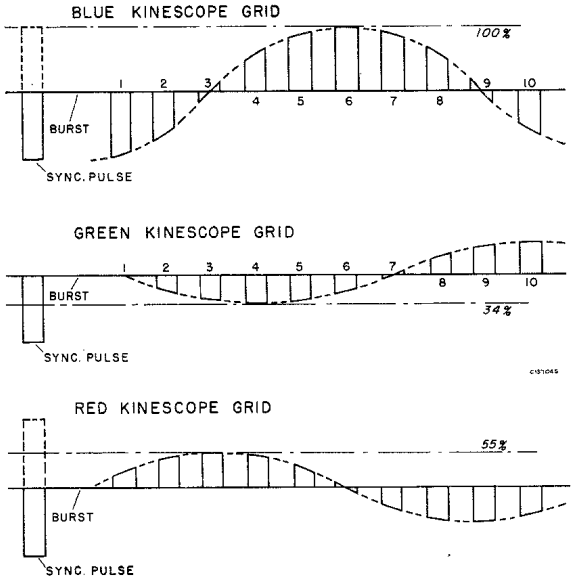


Figure 35—Matrix Waveforms

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

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

Depress the "BRIGHTNESS MOD." button. The reading should increase to —1.85 volts. Turn the metering switch to "off."

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

The normal sequence of the ten bars visible on the Kinescope, starting from the left side, should be as follows. At the extreme left a dull yellow-orange bar, orange, then a bright red, bluish-red, magenta, blue, greenish-blue, cyan, bright bluish-green and ending with a dark green bar at the extreme right.

Adjust the Fine Tuning control until the picture on the kinescope shows no sound interference. Advance the Color control R317, until color appears in the bar pattern. If the width control is properly adjusted (as explained in Installation Instructions) 10 color bars will be seen on the kinescope.

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

Set the Color control R317 to the center of its range.

Set the Hue control, C186, to the center of its range, capacitor plates halfway meshed.

Remove V115, the "Q" Phase Splitter, and observe the bar pattern on the kinescope. Adjust the receiver Brightness, Contrast and Hue controls if necessary. The sixth bar from the left should be the same as the background. If necessary, adjust L141 until the center of the sixth bar is equal to the background observed. Replace V115.

Remove V134, the "R-Y" Phase Splitter, and observe the pattern on the kinescope. Adjust only the receiver Brightness control if necessary. The second and eighth bars should be the same as the background. If necessary, adjust T125 (top) until the centers of the second and eighth bars appear equal to the background observed. Replace V134.

Short the red and green Kinescope grids to the chassis at the terminals on the rear apron. (See figure 36). The centers of the third and ninth bars should be at the same brightness level as the background. If necessary, readjust the "R-Y" Gain Control to achieve this condition.

Short the red and blue kinescope grids to ground. The centers of the first and seventh bars should appear the same green brightness level as the background.

Short the blue and green Kinescope grids to ground. The sixth bar should appear the same brightness as the background.

Remove the short on the Kinescope grids and remove the color bar generator.

(Alternate Method for Matrix Alignment using 100% Saturated Color Bar Signal)

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

Adjust the contrast control R204/R210, the Color control R317 and the Hue control to mid-range.

Connect the oscilloscope to red Kinescope grid on the rear apron.

Trigger the Oscilloscope at the horizontal sweep rate by clipping the lead from the oscilloscope to the red insulated lead from the yoke.

The signal on the oscilloscope will be the red signal.

Adjust L141 and color control R317 for correct red waveform.

Change the oscilloscope to test point TP102, at the "Q" Phase Splitter cathode, trigger the oscilloscope as before.

The signal on the oscilloscope will be the —"Q" signal.

Adjust the 3.58 mc C.W. transformer (T125 top) to place the "I" bar on the zero axis.

Connect the oscilloscope to the blue kinescope grid at the terminal on the rear edge of the chassis. (See figure 36.)

Adjust the "R-Y" Gain Control, and the Color control if necessary, for best cancellation of red and green.

Connect the oscilloscope to the green kinescope grid, at rear chassis terminal, and check the cancellation of the red, magenta and blue bars.

Connect the oscilloscope to the red kinescope grid and check the cancellation of the green, blue and cyan bars.

Repeat the matrixing adjustments until the best overall cancellation is obtained.

NOTE ON KRK12C TUNER ALIGNMENT. — The use of a crystal mixer in the KRK12C Tuner makes it necessary to observe the insert responses with the oscillator disabled. This is due to undesirable r-f/i-f interaction if the oscillator was allowed to operate during alignment. Therefore, the responses shown in figure 24 are not a strictly true representation of the insert band pass during actual operation. When an insert is aligned, using an oscilloscope to observe the response, the curve shown in figure 24(b) will be the correct response for reference. In actual operation, the band pass will be such that the sound and picture carriers will be at the tips of the curve. The adjacent channel picture and sound carriers will be in the valleys at each side. Care should be taken not to exceed the limits shown in figures 24(a) and 24(c).

The valley, in the center of the response curve, may vary from 0 to 50% above the base line for VHF inserts. Adjust the output level of the sweep generator to prevent excessive signal input to the tuner. Excessive signal input will be indicated by the valley rising above the 50% level, particularly on the higher VHF channels.

Oscillator injection voltage is not adjusted on VHF inserts. A check may indicate variations from .08 to .3 volts at TP1 but such readings should not be interpreted as an indication of trouble. On UHF channels, however, the injection voltage should be adjusted to fall within the specified limits.

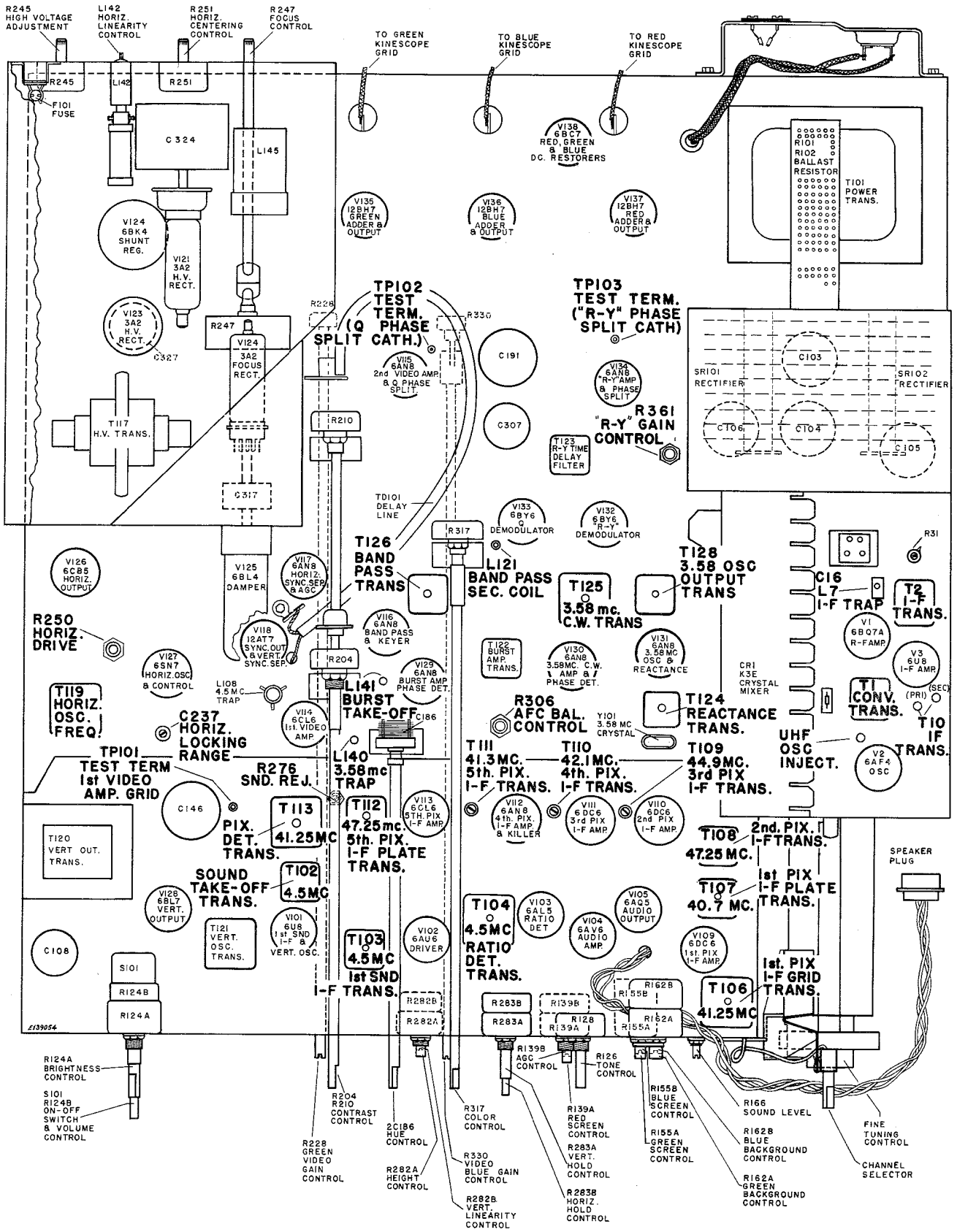


Figure 36—Top Chassis View showing Adjustments

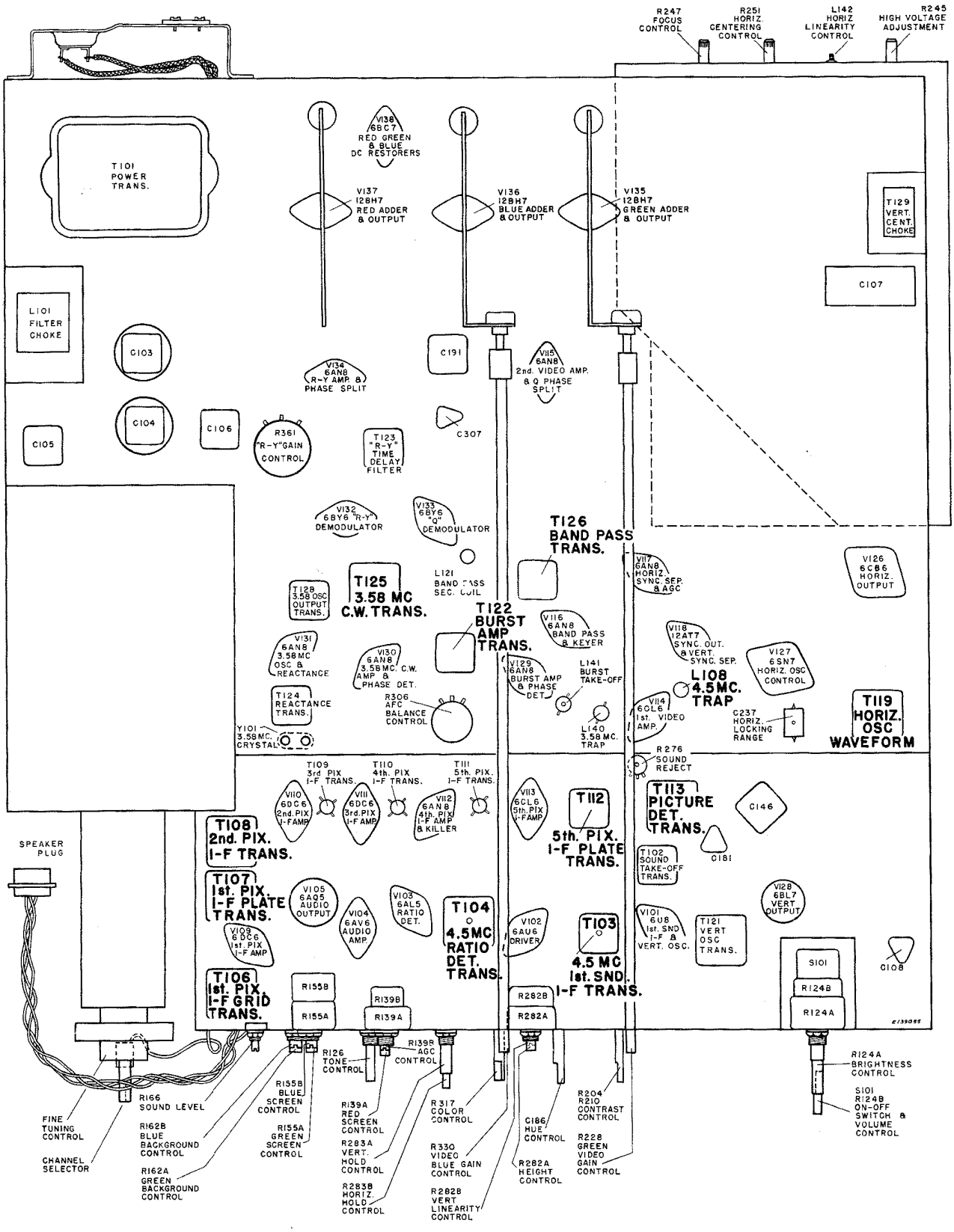


Figure 37—Bottom Chassis View showing Adjustments

VOLTAGE CHART

The following measurements represent the following conditions. A 1000 microvolt black and white signal was fed into the receiver, the picture synchronized and the AGC control properly adjusted. Voltages shown are read with a type WV97A Senior "VoltOhmyst" between the indicated terminal and chassis ground and with the receiver operating on 117 volts, 60 cycles, a-c.

Tube No.	Tube Type	Function	Operating Condition	E. Plate		E. Screen		E. Cathode		E. Grid		I Plate (ma.)	I Screen (ma.)	Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts			
V101A	6U8	1st Sound I-F Amp.	1000 Mu. V. Signal	6	125	3	125	7	1.15	2	—	—	—	At normal volume
V101B	6U8	Vertical Oscillator	1000 Mu. V. Signal	1	150	—	—	8	0	9	−25	—	—	—
V102	6AU6	Driver	1000 Mu. V. Signal	5	120	6	95	7	—	1	−7	—	—	At normal volume
V103	6AL5	Ratio Detector	1000 Mu. V. Signal	2	−13	—	—	5	−3.9	—	—	—	—	At normal volume
				7	−3.5	—	—	1	12	—	—			
V104	6AV6	1st Audio Amplifier	1000 Mu. V. Signal	7	110	—	—	2	—	1	−0.7	—	—	At normal volume
V105	6AQ5	Audio Output	1000 Mu. V. Signal	5	285	6	290	2	20	7	—	—	—	At normal volume
V109	6DC6	1st Pix I-F Amplifier	1000 Mu. V. Signal	5	275	6	260	2	0.24	1	−7.7	—	—	—
V110	6DC6	2nd Pix I-F Amplifier	1000 Mu. V. Signal	5	280	6	280	2	0.2	1	−7.7	—	—	—
V111	6DC6	3rd Pix I-F Amplifier	1000 Mu. V. Signal	5	220	6	220	2	0.51	1	−4.1	—	—	—
V112A	6AN8	4th Pix I-F Amplifier	1000 Mu. V. Signal	6	155	7	155	9	2.1	8	—	—	—	—
V112B	6AN8	Killer	1000 Mu. V. Signal	1	−16	—	—	3	—	2	−15	—	—	No Burst present
V113	6CL6	5th Pix I-F Amplifier	1000 Mu. V. Signal	6	210	3-8	210	1	4.1	2	—	—	—	—
V114	6CL6	1st Video Amplifier	1000 Mu. V. Signal	6	170	3-8	120	1	3.0	2	1.4	—	—	—
V115A	6AN8	2nd Video Amplifier	1000 Mu. V. Signal	6	150	7	165	9	15	8	8.5	—	—	—
V115B	6AN8	"Q" Phase Splitter	1000 Mu. V. Signal	1	134	—	—	3	19	2	15	—	—	—
V116A	6AN8	Band Pass Amplifier	1000 Mu. V. Signal	6	280	7	155	9	0	8	−17	—	—	No Burst present
V116B	6AN8	Keyer	1000 Mu. V. Signal	1	110	—	—	3	21	2	18	—	—	—
V117A	6AN8	AGC Amplifier	1000 Mu. V. Signal	6	−35	7	400	9	285	8	255	—	—	—
V117B	6AN8	Hor. Sync. Separator	1000 Mu. V. Signal	1	402	—	—	3	220	2	170	—	—	—
V118A	12AT7	Sync. Amplifier	1000 Mu. V. Signal	6	50	—	—	8	—	7	−.86	—	—	—
V118B	12AT7	Vert. Sync. Separator	1000 Mu. V. Signal	1	81	—	—	3	—	2	−26.5	—	—	—
V120	6BK4	Shunt Regulator	1000 Mu. V. Signal	Cap	25,000	—	—	1	405	5	—	—	—	—
V121	3A2	H.V. Rectifier	1000 Mu. V. Signal	Cap	*	—	—	1	25,000	—	—	—	—	*H.V. Pulse present
V123	3A2	H.V. Rectifier	1000 Mu. V. Signal	Cap	6,700	—	—	1	*	—	—	—	—	*H.V. Pulse present
V124	3A2	Focus Rectifier	1000 Mu. V. Signal	Cap	*	—	—	1	6,700	—	—	—	—	*H.V. Pulse present
V125	6BL4	Damper	1000 Mu. V. Signal	5	405	—	—	3	*750	—	—	—	—	*At B boost

Tube No.
V126
V127
V127
V128
V129
V129
V130
V130
V131
V131
V132
V133
V134
V134
V135
V135
V136
V136
V137
V137
V138
V138
V138
V139

VOLTAGE CHART

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Notes on easurements	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			
At normal volume	V126	6CB5	Horizontal Output	1000 Mu. V. Signal	Cap	*	1-8	180	3-6	—	4-5	−56	—	—	*H.V. Pulse present
—	V127	6SN7	Horizontal Oscillator	1000 Mu. V. Signal	5	270	—	—	6	—	4	−88	—	—	—
At normal volume	V127	6SN7	Horizontal Osc. Control	1000 Mu. V. Signal	2	200	—	—	3	−3.2	1	−29	—	—	—
At normal volume	V128	6BL7	Vertical Output	1000 Mu. V. Signal	2-5	370	—	—	3-6	21	1&4	—	—	—	—
At normal volume	V129A	6AN8	Burst Amplifier	1000 Mu. V. Signal	6	275	7	280	9	21	8	—	—	—	—
At normal volume	V129B	6AN8	Phase Detector	1000 Mu. V. Signal	1	—	—	—	3	20.5	2	—	—	—	No Burst present
—	V130A	6AN8	3.58 MC C.W. Amp.	1000 Mu. V. Signal	6	200	7	150	9	2.1	8	—	—	—	—
—	V130B	6AN8	Phase Detector	1000 Mu. V. Signal	1	−17.5	—	—	3	—	2	−17.5	—	—	No Burst present
—	V131A	6AN8	Reactance	1000 Mu. V. Signal	6	280	7	86	9	2.7	8	0.5	—	—	No Burst present
—	V131B	6AN8	3.58 MC. Oscillator	1000 Mu. V. Signal	1	100	—	—	3	—	2	−15	—	—	—
No Burst present	V132	6BY6	"R-Y" Demodulator	1000 Mu. V. Signal	5	210	6	81	2	1.3	1&7	—	—	—	—
—	V133	6BY6	"Q" Demodulator	1000 Mu. V. Signal	5	200	6	81	2	1.3	1&7	—	—	—	—
—	V134A	6AN8	"R-Y" Amplifier	1000 Mu. V. Signal	6	182	7	135	9	2.8	8	1.3	—	—	—
—	V134B	6AN8	"R-Y" Phase Splitter	1000 Mu. V. Signal	1	185	—	—	3	36	2	31	—	—	—
—	V135A	12BH7	Green Adder	1000 Mu. V. Signal	6	160	—	—	8	6.8	7	2.7	—	—	—
No Burst present	V135B	12BH7	Green Output	1000 Mu. V. Signal	1	212	—	—	3	6.5	2	0	—	—	—
—	V136A	12BH7	Blue Adder	1000 Mu. V. Signal	6	160	—	—	8	6.8	7	2.72	—	—	—
—	V136B	12BH7	Blue Output	1000 Mu. V. Signal	1	211	—	—	3	6.6	2	0	—	—	—
—	V137A	12BH7	Red Adder	1000 Mu. V. Signal	6	160	—	—	8	6.8	7	2.7	—	—	—
—	V137B	12BH7	Red Output	1000 Mu. V. Signal	1	211	—	—	3	6.3	2	0	—	—	—
—	V138A	6BC7	Green D.C. Restorer	1000 Mu. V. Signal	8	76	—	—	9	104	—	—	—	—	—
—	V138B	6BC7	Blue D.C. Restorer	1000 Mu. V. Signal	6	77	—	—	7	104	—	—	—	—	—
H.V. Pulse present	V138C	6BC7	Red D.C. Restorer	1000 Mu. V. Signal	2	68	—	—	1	99	—	—	—	—	—
H.V. Pulse present	V139	21AXP22	Red				3	370	4	160	2	98	—	—	—
H.V. Pulse present			Kine-scope Green	1000 Mu. V. Signal	Ultor Anode	25,000	7	350	5	160	6	103	—	—	—
At B boost			Blue				11	360	13	160	12	103	—	—	—

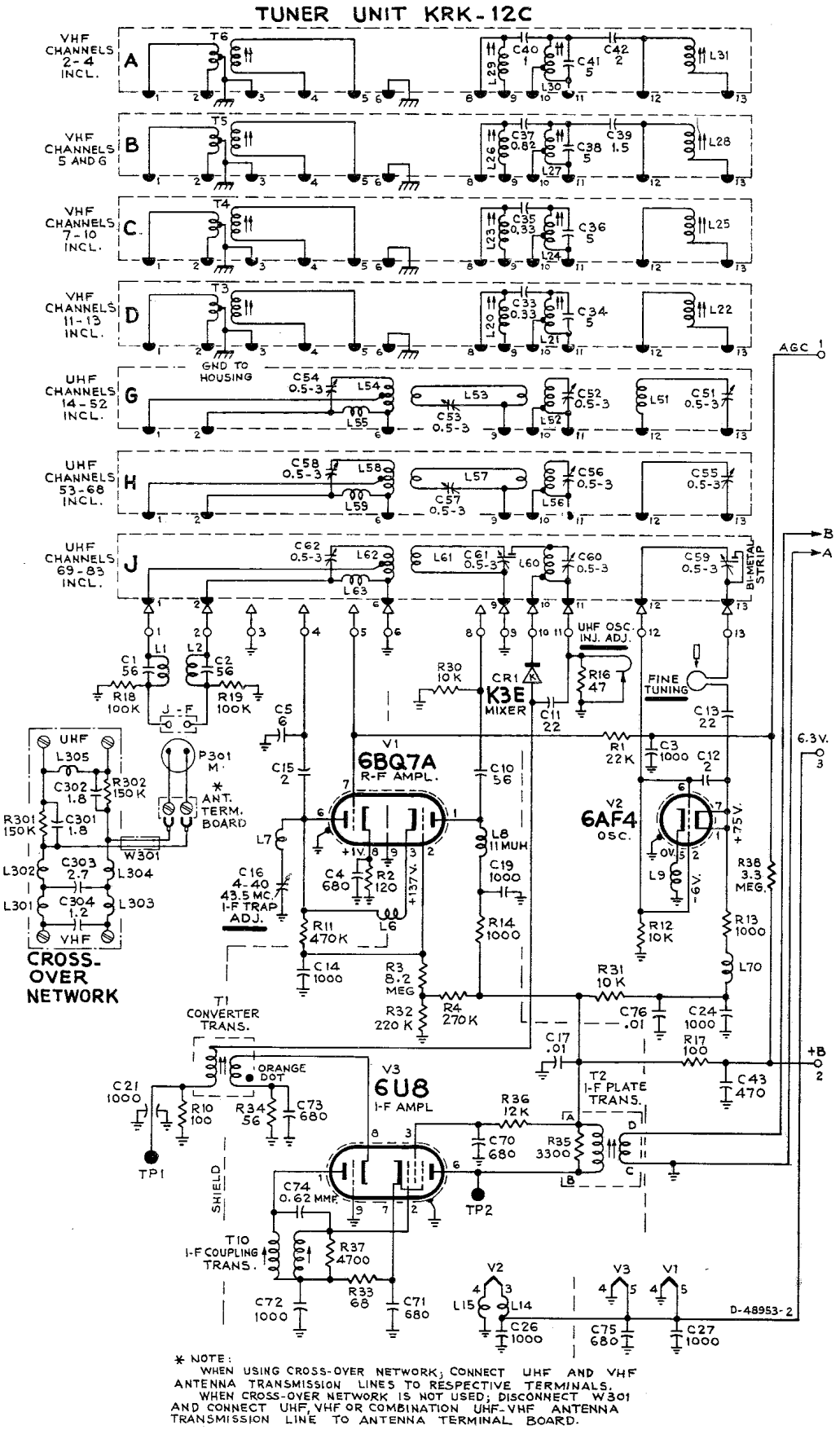
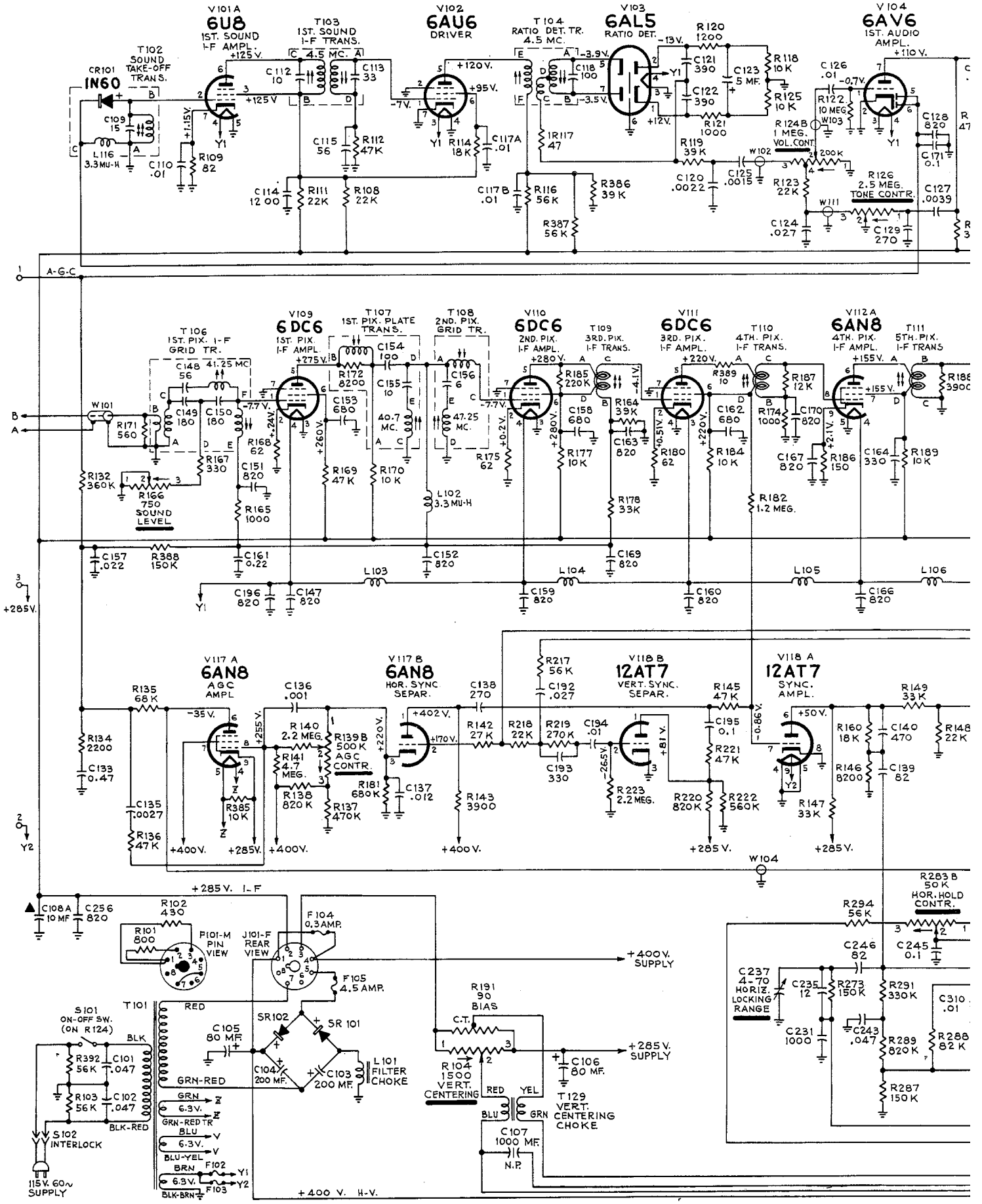
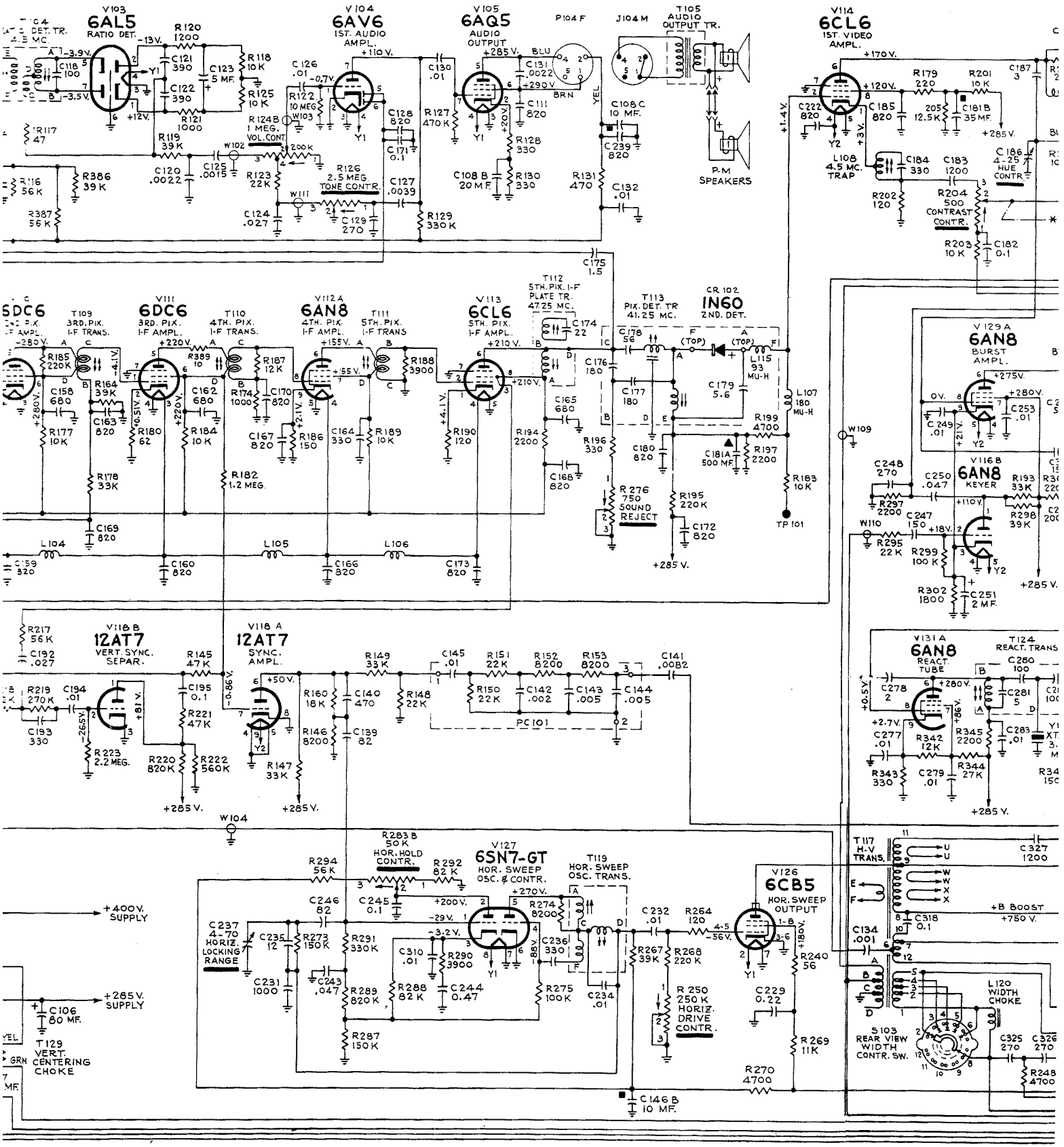


Figure 38—KRK12C Schematic Diagram

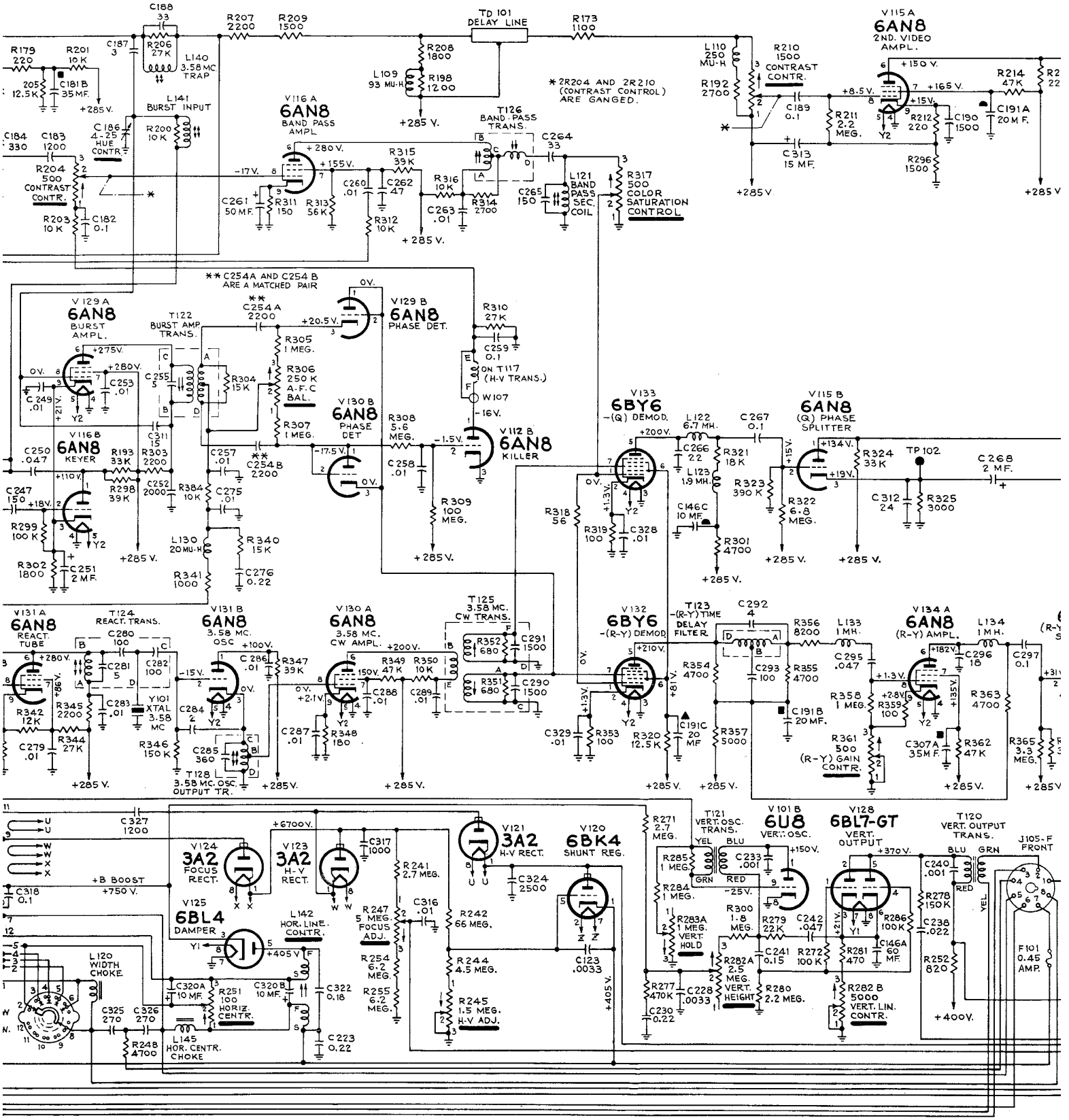




All capacitance values less than 1 in MF and above 1 in MMF unless otherwise noted. All resistance values in ohms. K=1000.

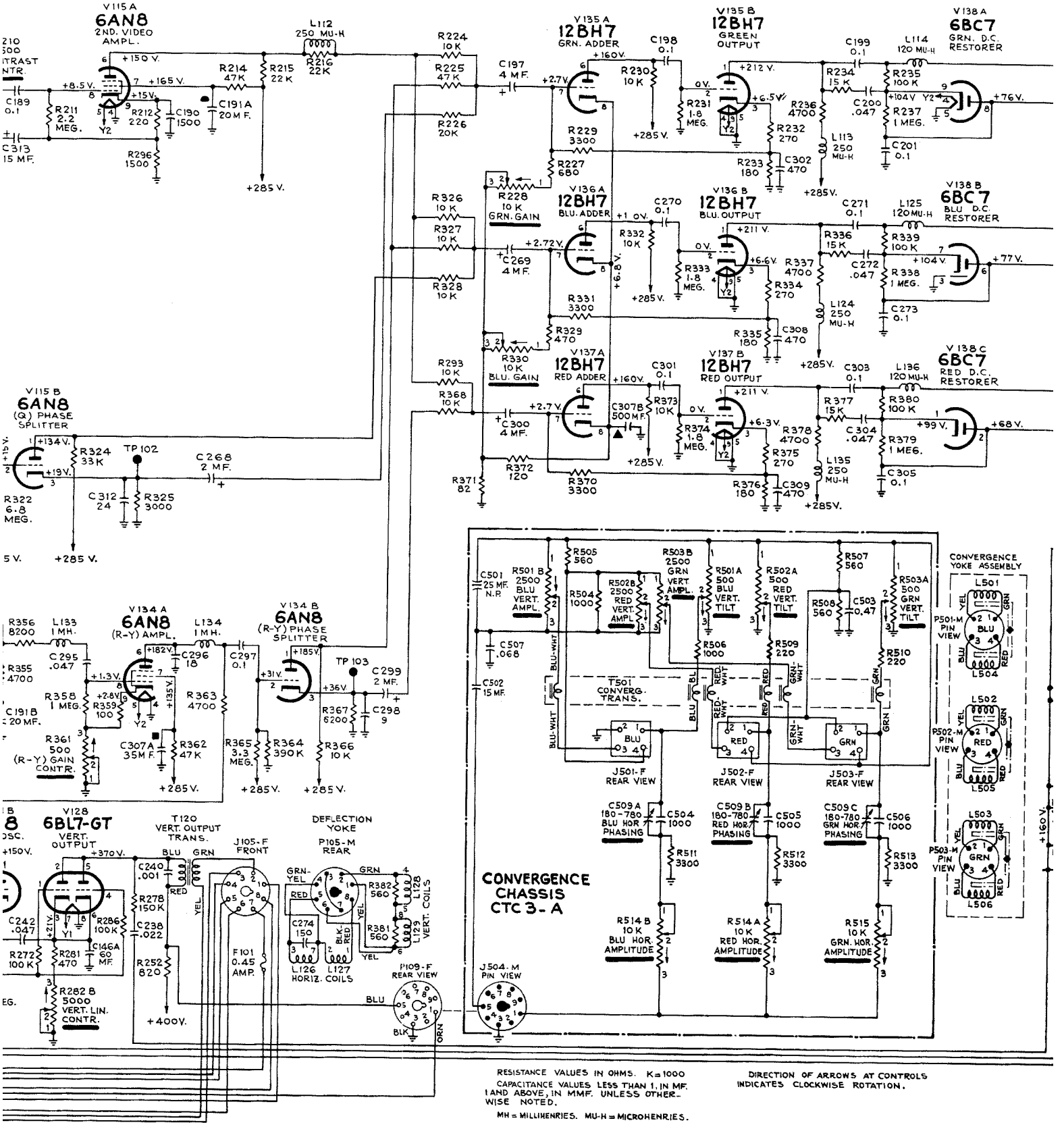
Direction of arro
clockwise rotation

SCHEMATIC DIAGRAM CTC2B WITH CONVERGENCE CHASSIS CTC3A



Direction of arrows at controls indicates clockwise rotation.

All voltages measured with "Volt-Ohmst" and with 1000μV black and white test signal. Voltages should hold within ±20% with 117 v. a-c supply.



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

DIRECTION OF ARROWS AT CONTROLS INDICATES CLOCKWISE ROTATION.

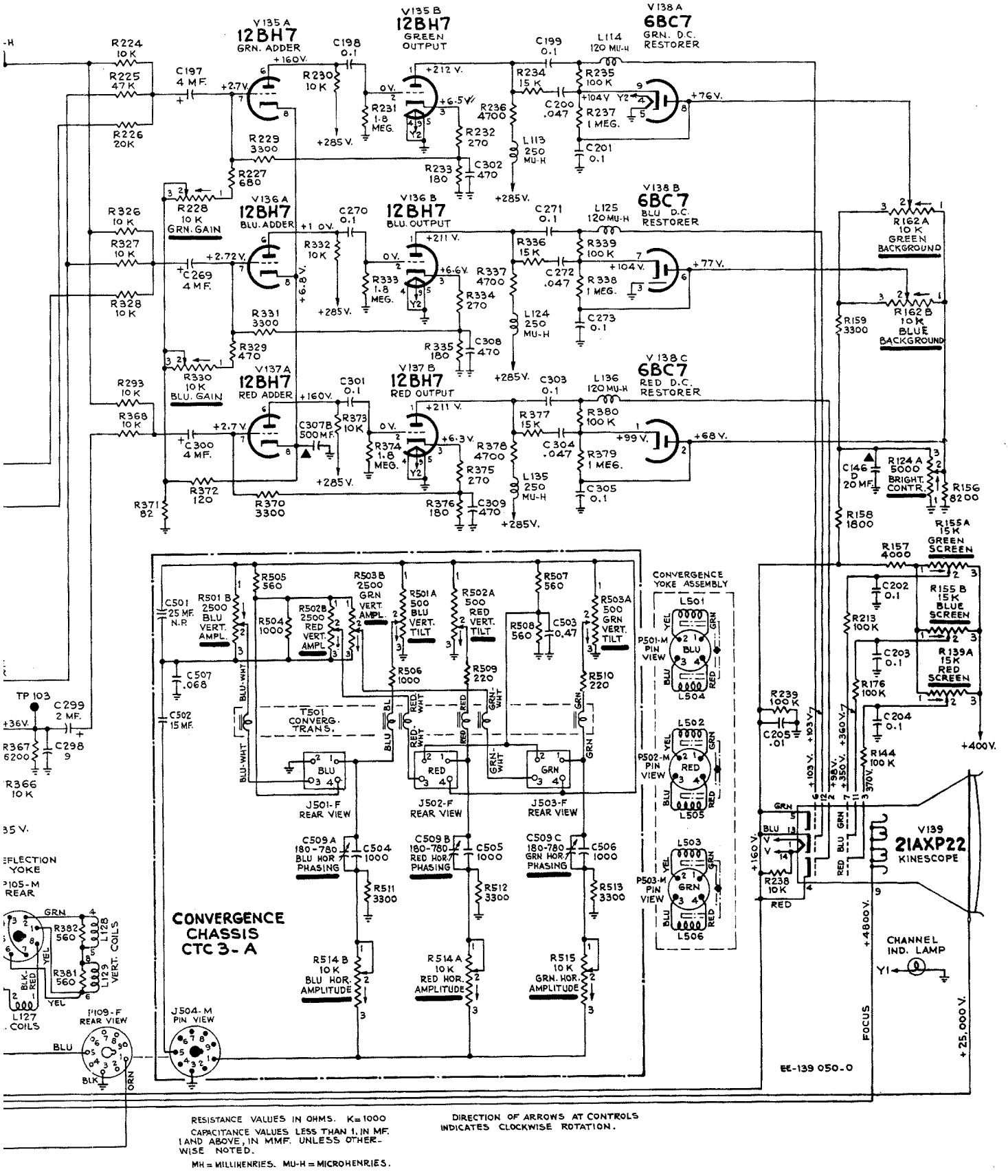


Figure 39—Circuit Schematic Diagram Model 21-CT-55

SYMBOL NO.	STOCK NO.	DESCRIPTION
		TUNER UNIT ASSEMBLIES KRK12C
C1		Part of L1
C2		Part of L2
C3	77615	Capacitor—Ceramic, stand-off, 1000 mmf.
C4	77624	Capacitor—Fixed, ceramic, 680 mmf., +100 −0%, 500 v. DC High "K" disc
C5	74182	Capacitor—Fixed, ceramic, non-insulated, 6 mmf., ±0.5 mmf., 500 volts DC Temp. coeff. −750
C10	71924	Capacitor—Fixed, ceramic, non-insulated, 56 mmf., ±10%, 500 volts DC Temp. coeff. −750
C11	77621	Capacitor—Fixed, ceramic, crystal holder, 22 mmf., ±10%, Temp. coeff. −750
C12, C13	77667	Capacitor—Fixed, ceramic, insulated, comprising:—1 section of 2 mmf., and 1 section of 22 mmf. Temp. coeff. −750
C14	77252	Capacitor—Fixed, ceramic, 1000 mmf., +100 −0%, 500 volts DC High "K" disc
C15	77210	Capacitor—Fixed, ceramic, non-insulated, 2 mmf., ±0.25 mmf., 500 volts DC
C16	77616	Capacitor—Adjustable mica, 4-40 mmf.
C17	73960	Capacitor—Fixed, ceramic, 10,000 mmf., +100 −0%, 500 volts DC High "K" disc
C19		Same as C3
C20		Same as C14
C21	77084	Capacitor—Ceramic, feed-thru, 1000 mmf.
C24		Same as C3
C26		Same as C3
C27		Same as C14
C33, C34		Part of 77605
C35, C36		Part of 77604
C37, C38, C39		Part of 77603
C40, C41, C42		Part of 77602
C43	77293	Capacitor—Fixed, ceramic, 470 mmf., +100 −0%, 500 volts DC High "K" disc
C70, C71	77624	Capacitor—Fixed, ceramic, 680 mmf., +100 −0%, 500 volts DC High "K" disc
C72		Same as C3
C73		Same as C70
C74	79166	Capacitor—Headed lead type, 0.62 mmf., ±5%, 500 volts DC
C75		Same as C70
CR1	78972	Rectifier—Germanium rectifier
L1, L2	77626	Trap—I.F. trap
L6	77627	Coil—Peaking coil (includes R11)
L7	77628	Coil—I.F. trap
L8	77695	Coil—R.F. plate coil
L9	77629	Coil—Oscillator cathode coil
L14	77631	Coil—Oscillator heater coil
L15	77632	Coil—Oscillator heater coil
L20, L21, L22		Part of 77605
L23, L24, L25		Part of 77604
L26, L27, L28		Part of 77603
L29, L30, L31		Part of 77602
L70	78224	Coil—Oscillator plate coil
R1	503322	Resistor—Fixed, composition: 22,000 ohms, ±10%, ½ w.
R2	503112	Resistor—Fixed, composition: 120 ohms, ±10%, ½ w.
R3	503582	Resistor—Fixed, composition: 8.2 megohm, ±10%, ½ w.
R4	503427	Resistor—Fixed, composition: 270,000 ohms ±10%, ½ w.
R10	503110	Resistor—Fixed, composition: 100 ohms ±10%, ½ w.
R11		Part of L6
R12	503310	Resistor—Fixed, composition: 10,000 ohms, ±10%, ½ w.
R13, R14	503210	Resistor—Fixed, composition: 1000 ohms, ±10%, ½ w.
R16	503047	Resistor—Fixed, composition: 47 ohms, ±10%, ½ w.
R17		Same as R10
R18, R19	503410	Resistor—Fixed, composition: 100,000 ohms, ±10%, ½ w.
R30	503310	Resistor—Fixed, composition: 10,000 ohms, ±10%, ½ w.
R31	79337	Resistor—Wire wound: 10,000 ohms, ±10%, 10 w.
R32	502422	Resistor—Fixed, composition: 220,000 ohms, ±10%, ½ w.
R33	503068	Resistor—Fixed, composition: 68 ohms, ±10%, ½ w.
R34	503056	Resistor—Fixed, composition: 56 ohms, ±10%, ½ w.
R35		Part of T2
R36	503312	Resistor—Fixed, composition: 12,000 ohms, ±10% ½ w.
R37	503247	Resistor—Fixed, composition: 4700 ohms, ±10%, ½ w.
R38	502533	Resistor—Fixed, composition: 3.3 megohm, ±5%, ½ w.
T1	77609	Transformer—Convertor transformer
T2	79100	Transformer—I.F. plate transformer
	77580	Ball—Steel ball (.125" dia.) (req'd)
	77579	Ball—Steel ball (.187" dia.)
	77589	Bracket—Lamp bracket
	78971	Cam—Tuner adjustment cam
	78963	Connector—Connector and bracket assembly female—2 contact
	77633	Connector—Formed grounding connector
	78601	Contact—Bracket and spring contact assembly for antenna secondary ground for units stamped KRK12C
	77612	Contact—Bracket and spring contact assembly for grounding rotor—assembled to base
	77618	Contact—Bracket and spring contact assembly for grounding rotor—assembled to oscillator shield
	78604	Contact—Contact and support assembly complete with 1 contact
	77606	Contact—Contact and support assembly complete with two (2) contacts and UHF antenna input connector
	77620	Contact—Contact and support assembly complete with four (4) contacts and holder for crystal rectifier
	77607	Contact—Contact and support assembly complete with five (5) contacts—rear chassis
	77617	Control—UHF oscillator injection adjustment control
	78975	Core—Fine tuning core
	77986	Gear—Rotor drive gear—nylon—32 teeth
	77602	Insert—VHF coil assembly insert—for channels 2, 3, or 4 (includes C40, C41, C142, L29, L30, L31, T6)
	77603	Insert—VHF coil assembly insert—for channels 5 or 6 (includes C37, C38, C39, L26, L27, L28, T5)
	77604	Insert—VHF coil assembly insert—for channels 7, 8, 9 or 10 (includes C35, C36, L23, L24, L25, T4)
	77605	Insert—VHF coil assembly insert—for channels 11, 12 or 13 (includes C33, C34, L20, L21, L22, T3)
	77590	Lever—Actuating lever for fine tuning link
	78968	Link—Fine tuning plunger link
	77581	Plate—Front plate and ball race
	78967	Plunger—Fine tuning plunger
	78972	Rectifier—Germanium rectifier 3E
	30340	Retainer—Retainer ring for fine tuning actuating lever stud
	77574	Rotor—Rotor frame
	78600	Shaft—Channel selector drive shaft complete with two (2) gears for units stamped KRK12C
	78449	Shaft—Indicator shaft
	78964	Shield—Oscillator shield and grounding spring
	77577	Shield—Top shield
	76534	Shield—Tube shield for V1, V3
	78965	Shield—Tube, 7 pin, miniature for V3
	78966	Socket—Tube, 7 pin, miniature, saddle-mounting
	77608	Socket—Tube socket, 9 pin, miniature, saddle mounted, moulded mica for V1, V3, V4
	78976	Socket—Tube, 9 pin, miniature, mica filled for V3
	78342	Spring—Channel selector drive shaft coil spring
	78246	Spring—Fine tuning link adjusting spring
	77578	Spring—Formed spring for holding rotor (on back of unit)
	77598	Spring—Rotor detent spring and roller complete with mounting bracket
	77587	Stud—Mounting stud for fine tuning link actuating lever
	76460	Terminal—Test point terminal
	77585	Washer—"C" washer for drive and indicator shafts (3 req'd)
	74623	Washer—#8-32 washer for rotor adjustment spring
		MAIN CHASSIS ASSEMBLIES CTC-2B
C101, C102	73592	Capacitor—Fixed, paper, 0.047 mf., ±20%, 600 v.
C103, C104	78957	Capacitor—Fixed, electrolytic, 200 mf., −10 +100, 250 v. DC
C105, C106	18950	Capacitor—Fixed, electrolytic, 80 mf., −10 +20, 450 v. DC
C107	79625	Capacitor—Fixed, electrolytic, 1000 mf., 3 v. DC N.P.
C108A,B,C	78929	Capacitor—Fixed, electrolytic, 10-10-20 mfd., −10 +50, +50, +250%, 450-450-25 v. DC
C109		Part of T102
C110	73960	Capacitor—Fixed, ceramic, 0.01 mf., +100 −10%, 500 v.
C111	78944	Capacitor—Fixed, ceramic, 820 mmf., ±20%, 500 v.
C112, C113		Part of T103
C114	39654	Capacitor—Fixed, mica, 1200 mmf., ±5%, 500 v.

SYMBOL NO.	STOCK NO.	DESCRIPTION
C115	71924	Capacitor—Fixed, ceramic, 56 mmf., ±5%, 500 v.
C117A,B	75877	Capacitor—Fixed, ceramic, 0.01/0.01 mf., +100 −0%, 500 v.
C118		Part of T104
C120	73595	Capacitor—Fixed, paper, 0.0022 mf., ±20%, 600 v.
C121, C122	79988	Capacitor—Fixed, mica, 390 mmf., ±5%, 500 v.
C123	78943	Capacitor—Electrolytic, 5 mmf., +100 −10%, 500 v.
C124	79989	Capacitor—Fixed, paper, .027 mf., ±10%, 200 v. DC
C125	73802	Capacitor—Fixed, moulded paper, tubular, .0015 mfd., ±10%, 1000 v. DC
C126	73561	Capacitor—Fixed, paper, 0.01 mf., ±20%, 400 v.
C127	78221	Capacitor—Fixed, paper, 0.0039 mf., ±10%, 600 v.
C128		Same as C111
C129	39638	Capacitor—Fixed, mica, 270 mmf., ±5%, 500 v.
C130	73594	Capacitor—Fixed, paper, 0.01 mf., ±20%, 600 v.
C131	73817	Capacitor—Fixed, paper, 0.0022 mf., ±20%, 1600 v.
C132		Same as C110
C133	78977	Capacitor—Fixed, paper, 0.47 mf., ±20%, 440 v.
C134	75643	Capacitor—Fixed, paper, 0.001 mf., ±10%, 600 v.
C135	73599	Capacitor—Fixed, paper, 0.0027 mf., ± 10%, 600 v.
C136		Same as C134
C137	79781	Capacitor—Fixed, paper, 0.012 mf., ±10%, 400 v.
C138	78916	Capacitor—Fixed, ceramic, 270 mmf., ±5%, 500 v.
C139	76474	Capacitor—Fixed, mica, 82 mmf., ±20%, 1000 v. DC
C140	39644	Capacitor—Fixed, mica, 470 mmf., ±10%, 500 v. DC
C141	78979	Capacitor—Fixed, paper, .0082 mf., ±10%, 600 v. DC
C142 to C145 Incl.		Part of PC101
C146A,B, C,D	78931	Capacitor—Fixed, electrolytic, 10-10-20-60 mfd., −10, +50, +50, +100, +250%, 450-450-150-25 v. DC
C147		Same as C111
C148 to C150 Incl.		Part of T106
C151, C152		Same as C111
C153	79980	Capacitor—Fixed, ceramic, 680 mmf., ±20%, 500 v. DC
C154, C155		Part of T107
C156		Part of T108
C157	73798	Capacitor—Fixed, paper moulded, .022 mf., ±20%, 600 v. DC
C158		Same as C153
C159, C160		Same as C111
C161	78905	Capacitor—Fixed, paper, 0.22 mf., ±20%, 200 v
C162		Same as C153
C163		Same as C111
C164	79979	Capacitor—Fixed, ceramic, 330 mmf., ±20%, 500 v. DC
C165		Same as C153
C166 to C170 Incl.		Same as C111
C171	73551	Capacitor—Fixed, paper, 0.1 mf., ±20%, 400 v.
C172, C173		Same as C111
C174		Part of T112
C175	78928	Capacitor—Fixed, ceramic, 1.5 mmf., ±0.25mmf., 500 v. DC
C176 to C179 Incl.		Part of T113
C180		Same as C111
C181A,B	78930	Capacitor—Fixed, electrolytic, 35 mfd., −10 +100%, 300 v. DC., 500 mfd., −10 +250%, 6 v. DC
C182		Same as C171
C183	39654	Capacitor—Fixed, mica, 1200 mmf., ±5%, 300 v.
C184	79191	Capacitor—Fixed, mica, 330 mmf., ±5%, 500 v.
C185		Same as C111
C186	79621	Trimmer—Hue control variable trimmer, 23-4 mmf.
C187	78911	Capacitor—Fixed, ceramic, 3.0 mmf., ±0.25 mmf., 500 v.
C188	70596	Capacitor—Fixed, ceramic, 33 mmf., ±5%, 500 v.
C189	78922	Capacitor—Fixed, paper, 0.1 mf., ±10%, 400 v.
C190	39652	Capacitor—Fixed, mica, 1500 mmf., ±5%. 500 v.
C191A,B,C	79976	Capacitor—Fixed, electrolytic, 20/20/20 mf., 450 v. DC
C192	73554	Capacitor—Fixed, paper, 0.027 mf., ±10%, 400 v.
C193		Same as C184
C194		Same as C126
C195		Same as C171
C196		Same as C111
C197	78919	Capacitor—Electrolytic, 4 mf., +100 −10%, 350 v.
C198 C199		Same as C189
C200	78921	Capacitor—Fixed, paper, 0.047 mf., ±10%, 400 v.
C201		Same as C171
C202 to C204 Incl.	73557	Capacitor—Fixed, paper, 0.1 mf., ±10%, 600 v.
C205	73822	Capacitor—Fixed, paper, .01 mf., ±10%, 1600 v. DC
C222		Same as C111
C223	74957	Capacitor—Fixed, paper, 0.22 mf., ±20%, 600 v. DC
C227	39396	Capacitor—Fixed, ceramic, 100 mmf., ±10%, 500 v. DC
C228	73795	Capacitor—Fixed, paper, 0.0033 mf., ±20%, 600 v.
C229	73794	Capacitor—Fixed, paper, 0.22 mf., ±20%, 400 v. DC
C230		Same as C223
C231	39652	Capacitor—Fixed, mica, 1000 mmf., ±5%, 500 v. DC
C232		Same as C130
C233	75249	Capacitor—Fixed, paper, 0.001 mf., ±20%, 600 v.
C234	73594	Capacitor—Fixed, paper, 0.01 mf., ±5%, 600 v.
C235	33380	Capacitor—Fixed, ceramic, 12 mmf., ±5%, 500 v.
C236	76476	Capacitor—Fixed, mica, 330 mmf., ±5%, 1000 v. DC
C237	74923	Trimmer—Horizontal locking range trimmer
C238		Same as C157
C239		Same as C111
C240	73849	Capacitor—Fixed, paper, 0.001 mf., ±10%, 1600 v. DC
C241	73793	Capacitor—Fixed, paper, 0.15 mf., ±10%, 400 v. DC
C242, C243	73553	Capacitor—Fixed, paper, 0.047 mf., ±20%, 400 v. DC
C244	73787	Capacitor—Fixed, paper, 0.47 mf., ±20%, 200 v.
C245		Same as C171
C246	71514	Capacitor—Fixed, ceramic, 82 mmf., ±5%, 500 v.
C247	44202	Capacitor—Fixed, ceramic, 150 mmf., ±5%, 500 v. DC
C248		Same as C129
C249		Same as C110
C250		Same as C200
C251	79181	Capacitor—Electrolytic, 2 mf., +100 −10%, 50 v.
C252	39659	Capacitor—Fixed, mica, 2000 mmf., ±5%, 500 v.
C253		Same as C110
C254A,B	78901	Capacitor—Fixed, mica, matched pair, 2200 mmf., ±10%, 500 v.
C255		Part of T122
C256		Same as C111
C257		Same as C126
C258		Same as C110
C259		Same as C171
C260		Same as C126
C261	78573	Capacitor—Fixed, electrolytic, 50 mf., +150 −10%, 6 v.
C262	78913	Capacitor—Fixed, ceramic, 47 mmf., ±5%, 500 v.
C263		Same as C110
C264		Same as C188
C265	79991	Capacitor—Fixed, ceramic, 150 mmf., ±5%, 500 v.
C266	33101	Capacitor—Fixed, ceramic, 22 mmf., ±5%, 500 v.
C267		Same as C171
C268	78920	Capacitor—Electrolytic, 2 mf., +100 −10%, 350 v.
C269		Same as C197
C270, C271		Same as C189
C272		Same as C200
C273		Same as C171
C274		Part of Yoke
C275		Same as C126
C276		Same as C161
C277		Same as C110
C278	79992	Capacitor—Fixed, ceramic, 2 mmf., ±0.25 mmf., 500 v.
C279		Same as C110
C280 to C282 Incl.		Part of T124
C283		Same as C110
C284		Same as C278
C285		Part of T128
C286 to C289 Incl.		Same as C110
C290, C291		Part of T125
C292	78912	Capacitor—Fixed, ceramic, 4 mmf., ±0.25 mmf., 500 v.
C293		Same as C227
C295		Same as C200
C296	39041	Capacitor—Fixed, ceramic, 18 mmf., ±5%, 500 v.
C297		Same as C171
C298	78914	Capacitor—Fixed, ceramic, 9 mmf., ±0.25 mmf., 500 v.
C299		Same as C268
C300		Same as C197
C301		Same as C189
C302	76992	Capacitor—Fixed, mica, 470 mmf., ±5%, 300 v.
C303		Same as C189
C304		Same as C200
C305		Same as C171

REPLACEMENT PARTS (Continued)

SYMBOL NO.	STOCK NO.	DESCRIPTION
C307A,B	78930	Capacitor—Fixed, electrolytic, 35/500 mf., −10 +100%, 300/6 v. DC
C308, C309		Same as C302
C310		Same as C126
C311	79993	Capacitor—Fixed, ceramic, 15 mmf., ±5%, 500 v.
C312	78915	Capacitor—Fixed, ceramic, 24 mmf., ±5%, 500 v.
C313	78917	Capacitor—Electrolytic, 15 mmf., +50 −10%, 450 v.
C316	78918	Capacitor—Fixed, paper, .01 mf., ±20%, 6000 v. DC
C317	79646	Capacitor—Fixed, ceramic, 1000 mmf., +50, −20%, 10,000 v.
C318	73551	Capacitor—Fixed, paper, .01 mmf., ±10%, 400 v. DC
C320	79786	Capacitor—Electrolytic, 10/10 mf., +250 −10%, 25 v.
C322	79041	Capacitor—Fixed, paper, 0.18 mf., ±10%, 400 v. DC
C323	79315	Capacitor—Fixed, paper, .0033 mf., ±10%, 400 v. DC
C324	79643	Capacitor—Fixed, ceramic, 2500 mmf., +50 −20%, 30,000 v.
C325, C326	100104	Capacitor—Fixed, ceramic, 270 mmf., ±10%, 3500 v. DC
C327	79647	Capacitor—Fixed, ceramic, 1200 mmf., 15 K.V.
C328, C329		Same as C110
CR101		Part of T102
CR102		Part of T113
F101	78798	Fuse—.45 amps., 250 v.
F102, F103	79358	Fuse—Heater fuse, 26AWG wire with glass sleeve
F104	77935	Fuse—0.3 amps., 250 v., glass
F105	79357	Fuse—4.5 amps., 250 v.
L101	79974	Choke—Filter choke
L102	78945	Coil—Choke coil, 3.3 microhenries
L103 to L106 Incl.	73477	Coil—Choke coil
L107	74214	Coil—Peaking coil, 180 microhenries
L108	78897	Coil—4.5 M.C. trap
L109	71527	Coil—Peaking coil, 93 microhenries
L110	71526	Coil—Peaking coil, 250 microhenries
L112, L113	71526	Coil—Peaking coil, 250 microhenries
L114	75253	Coil—Peaking coil, 120 microhenries
L115		Part of T113
L116		Part of T102
L120	79787	Coil—Width choke coil
L121	78888	Coil—Band pass secondary coil
L122	78902	Coil—Peaking coil, 6.7 millihenries
L123	78903	Coil—Peaking coil, 1.9 millihenries
L124		Same as L112
L125		Same as L114
L126 to L129 Incl.		Part of Yoke
L130	72618	Coil—Peaking coil, 20 microhenries
L133, L134	79185	Coil—Peaking coil, 1 millihenry
L135		Same as L112
L136		Same as L114
L140, L141	78892	Coil—Burst input, 3.58 M.C. trap
L142	79648	Coil—Horizontal linearity coil
L145	79644	Reactor—Horizontal centering reactor
PC101	79246	Circuit—Vertical integrator printed circuit. Includes R150, R151, R152, R153, C142, C143, C144, C145
P105-M	51209	Plug—Deflection Yoke Plug
R101, R102	79972	Resistor—Plug-in type resistor (ballast) 800 ohms, 15 w., 430 ohms, 30 w.
R103	503356	Resistor—Fixed, composition, 56,000 ohms, ±10%, ½ w.
R104	79448	Control—Vertical centering control
R108	522322	Resistor—Fixed, composition, 22,000 ohms, ±10%, 2 w.
R109	502082	Resistor—Fixed, composition, 82 ohms, ±5%, ½ w.
R110	503515	Resistor—Fixed, composition, 1.5 megohm, ±10%, ½ w.
R111		Same as R108
R112	503347	Resistor—Fixed, composition, 47,000 ohms, ±10%, ½ w.
R114	503318	Resistor—Fixed, composition, 18,000 ohms, ±10%, ½ w.
R116	523356	Resistor—Fixed, composition, 56,000 ohms, 10%, 2 w.
R117	502047	Resistor—Fixed, composition, 47 ohms, ±5%, ½ w.
R118	502310	Resistor—Fixed, composition, 10,000 ohms, ±5%, ½ w.
R119	503339	Resistor—Fixed, composition, 39,000 ohms, ±10%, ½ w.
R120	502212	Resistor—Fixed, composition, 1200 ohms, ±5%, ½ w.
R121	502210	Resistor—Fixed, composition, 1000 ohms, ±5%, ½ w.
R122	503610	Resistor—Fixed, composition, 10 megohm, ±10%, ½ w.
R123	503315	Resistor—Fixed, composition, 15,000 ohms, ±10%, ½ w.
R124A,B	78940	Control—"On-Off" volume and brightness control
R125		Same as R118
R126	78941	Control—Tone Control
R127	503447	Resistor—Fixed, composition, 470,000 ohms, ±10%, ½ w.
R128	76465	Resistor—Fixed, wire wound, 330 ohms, ±10%, 1 w.
R129	503433	Resistor—Fixed, composition, 330,000 ohms, ±10%, ½ w.
R130		Same as R128
R131	522147	Resistor—Fixed, composition, 470 ohms, ±10%, 2 w.
R132	502436	Resistor—Fixed, composition, 360,000 ohms, ±5%, ½ w.
R134	503222	Resistor—Fixed, composition, 2200 ohms, ±10%, ½ w.
R135	522368	Resistor—Fixed, composition, 68,000 ohms, ±10%, 2 w.
R136		Same as R112
R137	502447	Resistor—Fixed, composition, 470,000 ohms, ±5%, ½ w.
R138	502482	Resistor—Fixed, composition, 820,000 ohms, ±5%, ½ w.
R139A,B	78938	Control—Red screen and AGC control
R140	503522	Resistor—Fixed, composition, 2.2 megohm, ±10%, ½ w.
R141	503547	Resistor—Fixed, composition, 4.7 megohm, ±10%, ½ w.
R142	503327	Resistor—Fixed, composition, 27,000 ohms, ±10%, ½ w.
R143	503239	Resistor—Fixed, composition, 3900 ohms, ±10%, ½ w.
R144	522410	Resistor—Fixed, composition, 100,000 ohms, ±10%, 2 w.
R145		Same as R112
R146	503282	Resistor—Fixed, composition, 8200 ohms, ±10%, ½ w.
R147	522333	Resistor—Fixed, composition, 33,000 ohms, ±10%, 2 w.
R148	502322	Resistor—Fixed, composition, 22,000 ohms, ±10%, ½ w.
R149	503333	Resistor—Fixed, composition, 33,000 ohms, ±10%, ½ w.
R150 to R153 Incl.		Part of PC101
R154		Part of kinescope socket assembly
R155A,B	78939	Control—Blue & green screen control
R156	79783	Resistor—Fixed, wire wound, 8200 ohms, ±5%, 2 w.
R157	78907	Resistor—Fixed, wire wound, 4000 ohms, ±5%, 5 w.
R158	79983	Resistor—Fixed, wire wound, 1800 ohms, ±5%, 2 w.
R159	79782	Resistor—Fixed, wire wound, 3300 ohms, ±5%, 1 w.
R160		Same as R114
R161	79984	Resistor—Fixed, wire wound, 8200 ohms, ±5%, 2 w.
R162A,B	78935	Control—Blue & green background control
R163		Same ad R161
R164	502329	Resistor—Fixed, composition, 29,000 ohms, ±5%, ½ w.
R165	503210	Resistor—Fixed, composition, 1000 ohms, ±10%, ½ w.
R166	78933	Control—Sound rejection and sound level control
R167	502133	Resistor—Fixed, composition, 330 ohms, ±5%, ½ w.
R168	3579	Resistor—Fixed, composition, 62 ohms, ±5%, ½ w.
R169	513347	Resistor—Fixed, composition, 47,000 ohms, ±10%, 1 w.
R170	522310	Resistor—Fixed, composition, 10,000 ohms, ±10%, 2 w.
R171	502156	Resistor—Fixed, composition, 560 ohm, ±5%, ½ w.
R172		Part of T107
R173	502211	Resistor—Fixed, composition, 1100 ohms, ±5%, ½ w.
R175		Same as R168
R176		Same as R147
R177		Same as R170
R178	502333	Resistor—Fixed, composition, 33,000 ohms, ±5%, ½ w.
R179	503122	Resistor—Fixed, composition, 220 ohms, ±10%, ½ w.
R180		Same as R168
R181	503468	Resistor—Fixed, composition, 680,000 ohms, ±10%, ½ w.
R182	503512	Resistor—Fixed, composition, 1.2 meg., ±10%, ½ w.
R183	503310	Resistor—Fixed, composition, 10,000 ohms, ±10%, ½ w.
R184		Same as R170
R185	502422	Resistor—Fixed, composition, 220,000 ohms, ±5%, ½ w.
R186	502115	Resistor—Fixed, composition, 150 ohms, ±5%, ½ w.

SYMBOL NO.	STOCK NO.	DESCRIPTION
R187	502315	Resistor—Fixed, composition, 15,000 ohms, ±5%, ½ w.
R188	502239	Resistor—Fixed, composition, 3900 ohms, ±5%, ½ w.
R189		Same as R170
R190	502112	Resistor—Fixed, composition, 120 ohms, ±5%, ½ w.
R191	79973	Resistor—Bias resistor, 90 ohms, C/T, ±5%, 5 w.
R192	502227	Resistor—Fixed, composition, 2700 ohms, ±10%, ½ w.
R193	522333	Resistor—Fixed, composition, 33,000 ohms, ±5%, 2 w.
R194	78908	Resistor—Fixed, wire wound, 2200 ohms, ±10%, 5 w.
R195	502422	Resistor—Fixed, composition, 220,000 ohms, ±5%, ½ w.
R196		Same as R167
R197	502222	Resistor—Fixed, composition, 2200 ohms, ±5%, ½ w.
R198	502212	Resistor—Fixed, composition, 1200 ohms, ±10%, ½ w.
R199	502247	Resistor—Fixed, composition, 4700 ohms, ±5%, ½ w.
R200		Same as R183
R201	79182	Resistor—Fixed, wire wound, 10,000 ohms, ±10%, 10 w.
R202	512112	Resistor—Fixed, composition, 120 ohms, ±5%, 1 w.
R203		Same as R183
R204	78948	Control—Contrast control with short shaft
R205	79184	Resistor—Fixed, wire wound, 12,500 ohms, ±10%, 10 W.
R206		Same as R142
R207	522222	Resistor—Fixed, composition, 2200 ohms, ±5%, 2 w.
R208	512218	Resistor—Fixed, composition, 1800 ohms, ±5%, 1 w.
R209	522215	Resistor—Fixed, composition, 1500 ohms, ±5%, 2 w.
R210	79622	Control—Contrast control with long shaft
R211		Same as R140
R212	502122	Resistor—Fixed, composition, 220 ohms, ±10%, ½ w.
R213	502410	Resistor—Fixed, composition, 100,000 ohms, ±10%, ½ w.
R214	512347	Resistor—Fixed, composition, 47,000 ohms, ±10%, 1 w.
R215	522322	Resistor—Fixed, composition, 22,000 ohms, ±10%, 2 w.
R216		Same as R148
R217	503356	Resistor—Fixed, composition, 56,000 ohms, ±10%, ½ w.
R218		Same as R148
R219	503427	Resistor—Fixed, composition, 270,000 ohms, ±10%, ½ w.
R220	503482	Resistor—Fixed, composition, 820,000 ohms, ±10%, ½ w.
R221		Same as R112
R222	503456	Resistor—Fixed, composition, 560,000 ohms, ±10%, ½ w.
R223		Same as R140
R224		Same as R118
R225	502347	Resistor—Fixed, composition, 47,000 ohms, ±5%, ½ w.
R226	502320	Resistor—Fixed, composition, 20,000 ohms, ±5%, ½ w.
R227	502168	Resistor—Fixed, composition, 680 ohms, ±10%, ½ w.
R228	78949	Control—Blue & green gain control
R229	502233	Resistor—Fixed, composition, 3300 ohms, ±5%, ½ w.
R230	522310	Resistor—Fixed, composition, 10,000 ohms, ±5%, 2 w.
R231	502518	Resistor—Fixed, composition, 1.8 megohm, ±10%, ½ w.
R232	502127	Resistor—Fixed, composition, 270 ohms, ±5%, ½ w.
R233	502118	Resistor—Fixed, composition, 180 ohms, ±5%, ½ w.
R234		Same as R123
R235	503410	Resistor—Fixed, composition, 100,000 ohms, ±10%, ½ w.
R236	522247	Resistor—Fixed, composition, 4700 ohms, ±5%, 2 w.
R237	503510	Resistor—Fixed, composition, 1 megohm, ±10%, ½ w.
R238	512310	Resistor—Fixed, composition, 10,000 ohms, ±10%, 1 w.
R239	502410	Resistor—Fixed, composition, 100,000 ohms, ±10%, ½ w.
R240	502056	Resistor—Fixed, composition, 56 ohms, ±10%, ½ w.
R241	522527	Resistor—Fixed, composition, 2.7 megohm, ±5%, 2 w.
R242	100010	Resistor—Fixed, composition, 66 megohms, ±2%, 2 w.
R244	100009	Resistor—Fixed, composition, 4.5 megohms, ±1%, 1 w.
R245	79649	Control—High voltage adjustment control
R247	79028	Control—Focus control
R248	512247	Resistor—Fixed, composition, 4700 ohms, ±10%, 1 w.
R250	78950	Control—Horizontal drive control
R251	79650	Control—Horizontal centering control
R252	522182	Resistor—Fixed, composition, 820 ohms, ±10%, 2 w.
R254, R255	522562	Resistor—Fixed, composition, 6.2 megohm, ±5%, 2 w.
R264	503112	Resistor—Fixed, composition, 120 ohms, ±10%, ½ w.
R267	513339	Resistor—Fixed, composition, 39,000 ohms, ±10%, 1 w.
R268	502422	Resistor—Fixed, composition, 220,000 ohms, ±10%, ½ w.
R269	79987	Resistor—Fixed, wire wound, 11,000 ohms, ±10%, 10 w.
R270	503247	Resistor—Fixed, composition, 4700 ohms, ±10%, ½ w.
R271	523527	Resistor—Fixed, composition, 2.7 megohm, ±10%, 2 w.
R272		Same as R235
R273	503415	Resistor—Fixed, composition, 150,000 ohms, ±10%, ½ w.
R274	502282	Resistor—Fixed, composition, 8200 ohms, ±5%, ½ w.
R275	512410	Resistor—Fixed, composition, 100,000 ohms, ±5%, 1 w.
R276		Same as R166
R277		Same as R127
R278	522415	Resistor—Fixed, composition, 150,000 ohms, ±10%, 2 w.
R279	502322	Resistor—Fixed, composition, 22,000 ohms, ±5%, ½ w.
R280		Same as R140
R281	513147	Resistor—Fixed, composition, 470 ohms, ±10%, 1 w.
R282A,B	79628	Control—Vertical linearity height control
R283	78934	Control—Vertical & horizontal hold control
R284		Same as R110
R285		Same as R237
R286		Same as R183
R287	512415	Resistor—Fixed, composition, 150,000 ohms, ±5%, 1 w.
R288	512382	Resistor—Fixed, composition, 82,000 ohms, ±10%, 1 w.
R289		Same as R220
R290	502239	Resistor—Fixed, composition, 3900 ohms, ±5%, ½ w.
R291	512433	Resistor—Fixed, composition, 330,000 ohms, ±10%, 1 w.
R292		Same as R288
R293		Same as R118
R294	512356	Resistor—Fixed, composition, 56,000 ohms, ±10%, 1 w.
R295		Same as R148
R296	503215	Resistor—Fixed, composition, 1500 ohms, ±10%, ½ w.
R297	502222	Resistor—Fixed, composition, 2200 ohms, ±5%, ½ w.
R298	522339	Resistor—Fixed, composition, 39,000 ohms, ±5%, 2 w.
R299		Same as R235
R300		Same as R231
R301		Same as R270
R302	512218	Resistor—Fixed, composition, 1800 ohms, ±5%, 1 w.
R303		Same as R134
R304		Same as R123
R305	502510	Resistor—Fixed, composition, 1 megohm, ±5%, ½ w.
R306	78952	Control—A.F.C. balance control
R307		Same as R305
R308	502556	Resistor—Fixed, composition, 5.6 megohm, ±5%, ½ w.
R309	514710	Resistor—Fixed, composition, 100 megohms, ±20%, 1 w.
R310		Same as R142
R311	502115	Resistor—Fixed, composition, 150 ohms, ±10%, ½ w.
R312		Same as R183
R313		Same as R217
R314	503227	Resistor—Fixed, composition, 2700 ohms, ±10%, ½ w.
R315		Same as R267
R316	513310	Resistor—Fixed composition, 10,000 ohms, ±10%, 1 w.
R317	78951	Control—Color and "R-Y" gain control
R318		Same as R240
R319	503110	Resistor—Fixed, composition, 100 ohms, ±10%, ½ w.
R320		Same as R205

REPLACEMENT PARTS (Continued)

SYMBOL NO.	STOCK NO.	DESCRIPTION
R321	512318	Resistor—Fixed, composition, 18,000 ohms, ±5%, 1 w.
R322	502568	Resistor—Fixed, composition, 6.8 megohm, ±10%, ½ w.
R323	503439	Resistor—Fixed, composition, 390,000 ohms, ±10%, ½ w.
R324	512333	Resistor—Fixed, composition, 33,000 ohms, ±5%, 1 w.
R325	19794	Resistor—Fixed, composition, 3000 ohms, ±5%, ½ w.
R326		Same as R118
R327, R328		Same as R118
R329	503147	Resistor—Fixed, composition, 470 ohms, ±10%, ½ w.
R330		Same as R228
R331		Same as R229
R332		Same as R230
R333		Same as R231
R334		Same as R232
R335		Same as R233
R336		Same as R123
R337		Same as R236
R338		Same as R237
R339		Same as R235
R340		Same as R123
R341		Same as R121
R342	513312	Resistor—Fixed, composition, 12,000 ohms, ±10%, 1 w.
R343	502133	Resistor—Fixed, composition, 330 ohms, ±5%, ½ w.
R344	523327	Resistor—Fixed, composition, 27,000 ohms, ±10%, 2 w.
R345		Same as R134
R346	502415	Resistor—Fixed, composition, 150,000 ohms, ±10%, ½ w.
R347	522339	Resistor—Fixed, composition, 39,000 ohms, ±10%, 2 w.
R348	503118	Resistor—Fixed, composition, 180 ohms, ±10%, ½ w.
R349		Same as R214
R350		Same as R170
R351, R352		Part of T125
R353		Same as R319
R354, R355		Same as R199
R356		Same as R146
R357	79183	Resistor—Fixed, wire wound, 5000 ohms, ±10%, 5 w.
R358		Same as R237
R359		Same as R319
R361		Same as R317
R362		Same as R214
R363	512247	Resistor—Fixed, composition, 4700 ohms, ±5%, 1 w.
R364		Same as R323
R365	503533	Resistor—Fixed, composition, 3.3 megohm, ±10%, ½ w.
R366		Same as R230
R367	35255	Resistor—Fixed, composition, 6200 ohms, ±5%, ½ w.
R368		Same as R116
R369	502330	Resistor—Fixed, composition, 30,000 ohms, ±5%, ½ w.
R370		Same as R229
R371		Same as R109
R372		Same as R202
R373		Same as R230
R374		Same as R231
R375		Same as R232
R376		Same as R233
R377		Same as R123
R378		Same as R236
R379		Same as R237
R380		Same as R235
R381, R382		Part of Yoke
R384		Same as R183
R385		Same as R316
R386		Same as R267
R387		Same as R116
R388	502415	Resistor—Fixed, composition, 150,000 ohms, ±5%, ½ w.
R389	502010	Resistor—Fixed, composition, 10 ohms, ±10%, ½ w.
R392		Same as R103
S101, S102		Part of R124A,B
S103	79651	Switch—Width control switch
SR101, SR102	78894	Rectifier—Selenium rectifier
T101	79971	Transformer—Power transformer
T102	78995	Transformer—I.F. sound take-off transformer 4.5 M.C. (includes C109, CR101, L116)
T103	78996	Transformer—I.F. first sound 4.5 M.C. (includes C112, C113)
T104	79629	Transformer—I.F. ratio detector
T105	79986	Transformer—Audio output transformer (part of speaker)
T106	78987	Transformer—I.F. link pix (L2) transformer 43.5 M.C. (includes C148, C149, C150)
T107	78988	Transformer—I.F. 1st. pix (M1) transformer 44.0 M.C. (includes C154, C155, R172)
T108	78989	Transformer—I.F. 1st. pix (M2) transformer 4.40 M.C. (includes C156)
T109	78990	Transformer—I.F. 2nd. pix transformer 45.1 M.C.
T110	78991	Transformer—I.F. 3rd. pix transformer 42.7 M.C.
T111	78992	Transformer—I.F. 4th. pix transformer 41.4 M.C.
T112	78993	Transformer—I.F. 5th. pix (M1) transformer 44.75 M.C. (includes C174)
T113	78994	Transformer—I.F. 5th. pix transformer (M2) 44.75 M.C. (includes C176, C177, C178, C179, CR102, L115)
T117	79642	Transformer—High voltage transformer
T119	75213	Transformer—Horizontal oscillator transformer
T120	79630	Transformer—Vertical output transformer
T121	74144	Transformer—Vertical oscillator transformer
T122	78886	Transformer—Burst amplifier transformer 3.5 M.C.
T123	78890	Coil—"R-Y" delay filter coil
T124	78891	Coil—Reactance tube plate coil (includes C280, C281, C282)
T125	79623	Transformer—C.W. amplifier transformer 3.58 M.C.
T126	78887	Transformer—Band pass primary transformer
T128	78889	Coil—Oscillator output coil adjustable 3.6-9.5 microhenries
T129	78900	Coil—Vertical centering coil
TD101	79998	Line—Delay line
Y101	78896	Crystal—Plug-in type crystal 3.579545 K.C.
	79639	Bar—High voltage compartment shorting bar assembly
	79640	Bar—High voltage compartment shorting bar assembly
	78910	Board—Antenna terminal board
	78898	Board—Bracket and board assembly complete with socket for blue & green video board
	78899	Board—Bracket and board assembly complete with socket for red video board
	79627	Bracket—Terminal board bracket assembly
	79645	Bracket—Reactor mounting bracket
	79789	Cap—Tube cap & lead assembly
	79788	Cap—Tube cap & lead assembly
	79652	Connector—Female connector & lead polyethylene 12" long
	78904	Connector—Female three contact
	74594	Connector—Male connector—2 contact
	76460	Contact—Test point contact
	79001	Coupling—Color control shaft coupling
	78627	Coupling—Contrast and hue control coupling
	79624	Coupling—Contrast control coupling for R204 & R210
	78999	Coupling—Video control shaft coupling
	79635	Cover—Side cover assembly for high voltage compartment
	79653	Holder—Capacitor holder for C324
	78959	Holder—Crystal holder
	79641	Holder—Fuse holder assembly for F101
	75718	Lead—Channel indicator lead and connector assembly
	79636	Lid—Lid and side assembly for high voltage compartment
	79638	Pin—Shorting bar assembly pin
	18469	Plate—Electrolytic mounting plate for C103, C104
	35969	Retainer—"C" type retainer for focus control shaft
	2917	Retainer—Contrast, hue and color saturation shaft retainer
	77755	Retainer—F.M. trap retainer
	79637	Retainer—Shorting bar pin retainer
	70527	Screw—#6-32 set screw for video control shaft coupling
	79633	Shaft—Color control shaft
	79631	Shaft—Contrast control shaft
	79654	Shaft—Focus control shaft
	79632	Shaft—Hue control shaft
	79003	Shaft—Video control shaft glass polyesther
	79032	Shell—Corona and high voltage capacitor mounting shell
	73521	Shield—Tube shield for V102, V103, V109, V110, V111, V132, V133
	76972	Shield—Tube shield for V112, V113, V114, V130, V131, V134
	100002	Shield—Tube shield for V123, V124
	76534	Shield—Tube shield for V135
	79970	Socket—Crystal mounting socket for Y101
	79997	Socket—Kine socket and lead assembly
	73117	Socket—Tube socket, 7 pin, miniature for V102, V103, V104, V109, V110, V111, V133, V135
	79180	Socket—Tube socket, ceramic, 7 pin miniature for V105
	72627	Socket—Tube socket, 8 pin, ceramic for V127
	68590	Socket—Tube socket, octal for V120, V126, V128
	79655	Socket—Tube socket, octal for V125

SYMBOL NO.	STOCK NO.	DESCRIPTION
	76971	Socket—Tube socket, 9 pin miniature for V112, V113, V116, V117, V118, V130, V131, V132, V134
	79656	Socket—Tube socket, 9 pin miniature for V121, V123, V124
	79002	Spring—Compression spring for contrast—hue-color saturation control shaft
	75564	Spring—Focus control shaft spring
	79634	Spring—Main base assembly grounding spring
	76463	Terminal—#8 test point & grounding terminal
	76460	Terminal—Test point terminal
	78818	Trap—F.M. trap
		CONVERGENCE CHASSIS ASSEMBLIES CTC-3A
C501	78924	Capacitor—Fixed, electrolytic, 25 mfd., +250 −10%, 10 v. N.P.
C502	78917	Capacitor—Fixed, electrolytic, 15 mfd., −10 +50%, 450 v. DC
C503	73787	Capacitor—Fixed, paper, 0.47 mf., ±20%, 200 v. DC
C504 to C506 Incl.	39652	Capacitor—Fixed, mica, 1000 mfd., ±5%, 500 v. DC
C507	79016	Capacitor—Fixed, paper, .068 mf., ±20%, 200 v. DC
C509A,B,C	100008	Capacitor—Variable trimmer, 3 section 180-780 mmf.
J501A to J503A Incl.	79662	Connector—Female, 4 contact, bracket mounting, phenolic
J504	75062	Plug—9 contact plug male
R501A,B to R503A,B, Incl.	100006	Control—Blue, red and green vertical tilt and vertical amplitude controls
R504	502210	Resistor—Fixed, composition, 1000 ohms, ±5%, ½ w.
R505	502156	Resistor—Fixed, composition, 560 ohms, ±5%, ½ w.
R506	502210	Resistor—Fixed, composition, 1000 ohms, ±10%, ½ w.
R507, R508		Same as R505
R509, R510	502122	Resistor—Fixed, composition, 220 ohms, ±10%, ½ w.
R511 to R513 Incl.	502233	Resistor—Fixed, composition, 3300 ohms, ±5%, ½ w.
R514A,B	100007	Control—Red horizontal and blue horizontal amplitude control
R515	79659	Control—Green horizontal amplitude control
T501	79664	Choke—Convergence choke assembly
	75064	Connector—Convergence cable connector
	79982	Decal—Control marker decal
		SPEAKER ASSEMBLIES 92586-4 OR 9
	74664	Speaker—8" P.M. speaker complete with cone and voice coil (3.2 ohms)
		MISCELLANEOUS
	79594	Back—Cabinet back assembly complete with power cord
	79615	Bracket—Cover and case assembly mounting bracket
	79666	Bracket—Kinescope mask mounting bracket
	79602	Bracket—Kinescope radiation shield mounting bracket
	100067	Cable—Grounding cable complete with 2 clips for color equalizer
	79600	Cable—Safety glass retainer grounding cable
	79597	Clamp—Safety glass corner insert side clamp
	79598	Clamp—Safety glass retainer top and bottom clamp
	76837	Clip—Brightness and contrast control knob retaining clip for 79470 and 75945
	30330	Clip—"On-Off" volume control knob clip
	X3444	Cloth—Grille cloth for cabinet
	100019	Coil—Pole piece exciter coil
	100005	Connector—Anode lead connector assembly
	79668	Connector—Pole piece exciter connector (male)
	71457	Cord—Power cord and plug
	79590	Cover—Cover and case assembly for hidden controls for mahogany instruments
	79411	Cushion—Rubber cushion safety glass corner insert assembly
	79620	Cushion—Rubber cushion for shield assembly
	79612	Cushion—Safety glass rubber cushion (long)
	79617	Cushion—Safety glass rubber cushion (short)
	79593	Decal—Control marking decal hidden control cover and case assembly
	78631	Decal—Control marker decal
	77783	Emblem—"DeLuxe" emblem
	79589	Escutcheon—Channel marker escutcheon
	77880	Fastener—Tie rod fastener
	79591	Glass—Safety glass
	79608	Holder—Deflection yoke holder
	79431	Insert—Safety glass retainer channel inserts for sides
	79611	Insert—Safety glass corner insert (L.H.)
	79613	Insert—Safety glass corner insert (R.H.)
	79470	Knob—Brightness control knob
	79588	Knob—Channel selector knob
	75945	Knob—Contrast-hue-color and tone control knob
	100000	Knob—Fine tuning control knob
	79471	Knob—"On-Off" volume control knob
	11891	Lamp—Pilot lamp-Mazda #51
	79669	Magnet—Blue Lateral magnet assembly
	100020	Magnet—Magnet and knob assembly (convergence)
	100021	Magnet—Convergence pole piece magnet assembly complete
	79604	Magnet—Purity magnet ring assembly
	79587	Mask—Kinescope metal mask
	77784	Medallion—"His Master's Voice" medallion
	79124	Network—Antenna terminal board assembly
	74337	Nut—Retaining nut for deluxe emblem
	73634	Nut—Speaker mounting screw nut
	76177	Nut—#10-32 thread for kinescope mounting rod
	79619	Plate—Kinescope mask mounting plate
	77928	Retainer—Channel selector knob retainer
	79595	Retainer—Safety glass retainer channel for sides
	79614	Retainer—Safety glass top and bottom channel retainer
	79606	Ring—Deflection yoke holder ring
	79596	Rod—Deflection yoke hood mounting rod
	79619	Seal—Kinescope dust seal
	78447	Shield—Channel selector knob shield
	100003	Shield—Polyethylene shield for kinescope
	100060	Spring—Blue lateral mounting spring
	78325	Spring—Channel selector shield spring
	79616	Spring—Cover and case bracket spring
	79103	Spring—Ground spring for ring assembly
	79599	Spring—Safety glass insert springs
	79228	Washer—Felt washer disc for contrast-hue-color-tone control knob (75945)
	100001	Washer—Spring washer for deflection yoke holder
	79605	Yoke—Deflection yoke assembly