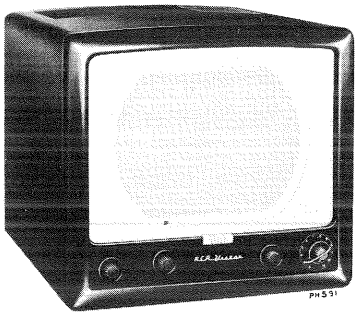
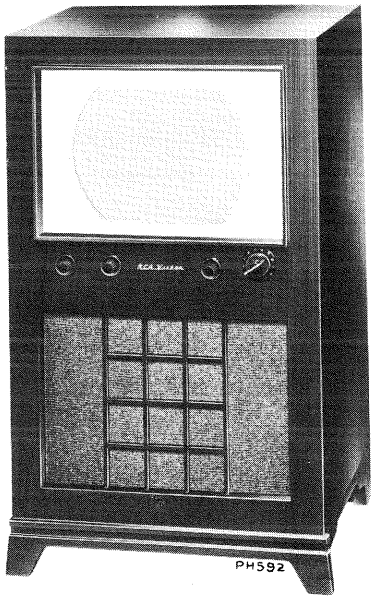


Model 2T51 "Shelby" Mahogany Finish



Model 2T60 "Cumberland" Walnut, Mahogany or Oak

RCA VICTOR

TELEVISION RECEIVERS MODELS 2T51, 2T60

Chassis Nos. KCS45, or KCS45A

— Mfr. No. 274 —

SERVICE DATA

— 1950 No. T12 —

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

GENERAL DESCRIPTION

Model 2T51 and 2T60 receivers employ nineteen tubes plus rectifier and a 12LP4 kinescope. The receivers are identical except for cabinets, jewel lights, speakers and filter chokes.

Features of the television unit are: full twelve channel coverage; FM sound system; improved picture brilliance; picture A-G-C; A-F-C horizontal hold; stabilized vertical hold; two stages of video amplification; noise saturation circuits; improved sync separator and clipper; four mc. band width for picture channel and reduced hazard high voltage supply. An auxiliary audio input jack is provided to permit the use of an external record playing attachment.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

PICTURE SIZE .....87 square inches on a 12LP4 Kinescope

TELEVISION R-F FREQUENCY RANGE

All 12 television channels, 54 mc. to 88 mc. 174 mc. to 216 mc.
Fine Tuning Range..±250 kc. on chan. 2, ±650 kc. on chan. 13
Picture Carrier Frequency .....25.50 mc.
Sound Carrier Frequency .....21.00 mc.

VIDEO RESPONSE .....To 4 mc.

SWEEP DEFLECTION .....Magnetic

FOCUS .....Magnetic

POWER SUPPLY RATING .....115 volts, 60 cycles, 160 watts

AUDIO POWER OUTPUT RATING .....5 watts max.

CHASSIS DESIGNATIONS

KCS45 ..... In Model 2T51
KCS45A ..... In Model 2T60

LOUDSPEAKERS

KCS45 ..... (970773-2) 5" x 7" EM Dynamic, 3.2 ohms
KCS45A ..... (92580-4W) 8" PM Dynamic, 3.2 ohms

DIMENSIONS (inches)	Width	Height	Depth
Cabinet (outside), 2T51	18⅛	16⅛	22
Cabinet (outside), 2T60	21	34¼	21
Chassis (overall)	16	15	19

WEIGHT Model	Chassis with Tubes in Cabinet	Shipping Weight
2T51	73 lbs.	85 lbs.
2T60	81 lbs.	98 lbs.

RECEIVER ANTENNA INPUT IMPEDANCE

Choice: 300 ohms balanced or 72 ohms unbalanced.

RCA TUBE COMPLEMENT

	Tube Used	Function
(1)	RCA 6CB6	R-F Amplifier
(2)	RCA 6J6	R-F Oscillator and Mixer
(3)	RCA 6AU6	1st Sound I-F-Amplifier
(4)	RCA 6AU6	2nd Sound I-F Amplifier
(5)	RCA 6AL5	Sound Discriminator
(6)	RCA 6AV6	1st Audio Amplifier
(7)	RCA 6AQ5	Audio Output
(8)	RCA 6AU6	1st Picture I-F Amplifier
(9)	RCA 6CB6	2nd Picture I-F Amplifier
(10)	RCA 6AU6	3rd Picture I-F Amplifier
(11)	RCA 6CB6	4th Picture I-F Amplifier
(12)	RCA 6AL5	Picture 2nd Detector and AGC Detector
(13)	RCA 12AU7	1st and 2nd Video Amplifier
(14)	RCA 12AU7	DC Restorer and Sync Separator
(15)	RCA 6AV6	Vertical Sweep Oscillator
(16)	RCA 6AQ5	Vertical Sweep Output
(17)	RCA 6SN7GT	Horizontal Sweep Oscillator and Control
(18)	RCA 6AU5GT	Horizontal Sweep Output
(19)	RCA 6W4GT	Damper
(20)	RCA 1B3-GT/8016	High Voltage Rectifier
(21)	RCA 12LP4	Kinescope

Specifications continued on page 2

(Continued)

PICTURE INTERMEDIATE FREQUENCIES

Picture Carrier Frequency	25.50 Mc.
Adjacent Channel Sound Trap	27.00 Mc.
Accompanying Sound Traps	21.00 Mc.
Adjacent Channel Picture Carrier Trap	19.50 Mc.

SOUND INTERMEDIATE FREQUENCIES

Sound Carrier Frequency	21.00 Mc.
Sound Discriminator Band Width between peaks	400 kc

VIDEO RESPONSE	To 4 Mc.
FOCUS	Magnetic
SWEEP DEFLECTION	Magnetic
HORIZONTAL SWEEP FREQUENCY	15,750 cps
SCANNING	Interlaced, 525 line
VERTICAL SWEEP FREQUENCY	60 cps
FRAME FREQUENCY (Picture Repetition Rate)	30 cps

OPERATING INSTRUCTIONS

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

1. See that the TV-PH switch on the rear apron is in the "TV" position.

2. Turn the receiver "ON" and advance the SOUND VOLUME control to approximately mid-position.

3. Set the STATION SELECTOR to the desired channel.

4. Adjust the FINE TUNING control for best sound fidelity and the SOUND VOLUME control 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. Adjust the PICTURE and brightness controls for suitable picture contrast and brightness.

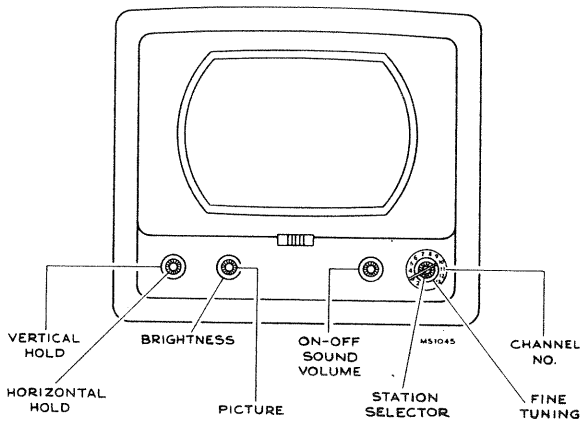


Figure 1—Receiver Operating Controls

9. After the receiver has been on for some time, it may be necessary to readjust the FINE TUNING control slightly for improved sound fidelity.

10. In switching from one position to another, it may be necessary to repeat steps 4 and 8.

11. When the set is turned on again after an idle period it should not be necessary to repeat the adjustments if the positions of the controls have not been changed. If any adjustment is necessary, step number 4 is generally sufficient.

12. If the positions of the controls have been changed, it may be necessary to repeat steps 2 through 9.

13. To use a record player, plug the record-player output cable into the PHONO jack on the rear apron, and set the TV-PH switch to "PH." Upon completion of the record program, set the TV-PH switch to TV position.

HIGH VOLTAGE WARNING

OPERATION OF THIS RECEIVER OUTSIDE THE CABINET OR WITH THE COVERS REMOVED, INVOLVES A SHOCK HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THE RECEIVER SHOULD NOT BE ATTEMPTED BY ANYONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY WHEN WORKING ON HIGH VOLTAGE EQUIPMENT. DO NOT OPERATE THE RECEIVER WITH THE HIGH VOLTAGE COMPARTMENT SHIELD REMOVED.

KINESCOPE HANDLING PRECAUTIONS

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

INSTALLATION INSTRUCTIONS

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

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

Connect the antenna transmission line to the receiver antenna terminals. Plug a power cord into the 115 volt a-c power source and into the receiver interlock receptacle. Turn the receiver power switch to the "on" position, the brightness control fully clockwise, and the picture control counter-clockwise.

ION TRAP MAGNET ADJUSTMENT.—Set the ion trap magnet approximately in the position shown in Figure 2. Starting from this position immediately adjust the magnet by moving it forward or backward at the same time rotating it slightly around the neck of the kinescope for the brightest raster on the screen. Reduce the brightness control setting until the raster is slightly above average brilliance. Turn the focus control (shown in Figure 2) until the line structure of the raster is clearly visible. Readjust the ion trap magnet for maximum raster brilliance. The final touches of this adjustment should be made with the brightness control at the maximum clockwise position with which good line focus can be maintained.

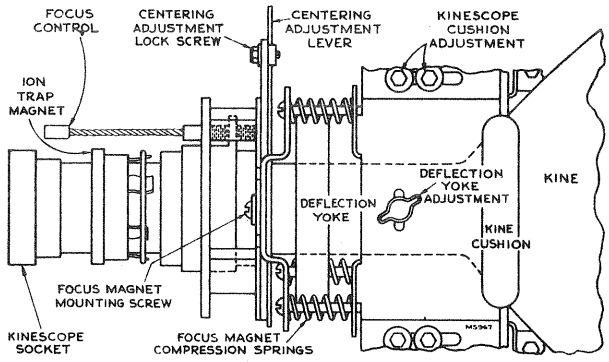


Figure 2—Yoke and Focus Magnet Adjustments

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

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

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, turn S105 on the rear apron (see Figure 3) counter-clockwise until the set operates normally and the picture can be synced.

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 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 when the control is approximately 90 degrees from the extreme counter-clockwise position. The picture should remain in sync for approximately 90 degrees of additional clockwise rotation of the control. At the extreme clockwise position, the picture should be out of sync and should show 1 vertical or diagonal black bar in the raster.

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

ALIGNMENT 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 90 degrees of clockwise rotation of the control

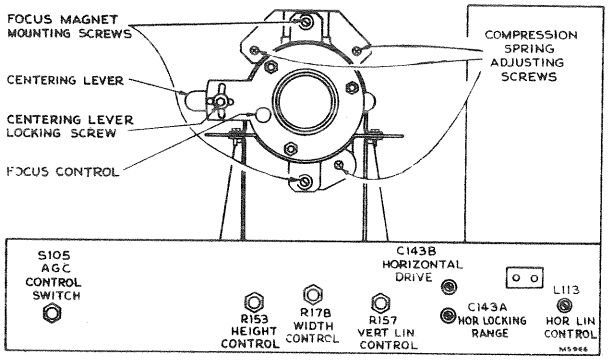


Figure 3—Rear Chassis Adjustments

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 T107 horizontal frequency adjustment on top of the chassis until the picture is just out of sync and the horizontal blanking appears as a vertical or diagonal black bar in the raster.

Horizontal Locking Range 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 T108 top core 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 2 bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C147A slightly clockwise. If less than 2 bars are present, adjust C147A 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 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 13. For field purposes paragraph "A" under Horizontal Oscillator Waveform Adjustment may be omitted.

FOCUS MAGNET ADJUSTMENT.—The focus coil should be adjusted so that there is approximately three-eighths inch of space between the rear cardboard shell of the yoke and the flat of the front face of the focus magnet. This spacing gives best average focus over the face of the tube.

The axis of the hole through the magnet should be parallel with the axis of the kinescope neck with the kinescope neck through the middle.

CENTERING ADJUSTMENT.—No electrical centering controls are provided. Centering is accomplished by means of a separate plate on the focus magnet. Some centering plates include a locking screw which must be loosened before centering, and others are held in adjustment by friction. Up and down adjustment of the plate moves the picture side to side and sidewise adjustment moves the picture up and down.

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

WIDTH, DRIVE AND HORIZONTAL LINEARITY ADJUSTMENTS.—Adjustment of the horizontal drive control affects the high voltage applied to the kinescope. In order to obtain the highest possible voltage hence the brightest and best focused picture, adjust horizontal drive counter-clockwise as far as possible without stretching the left side of the picture. As a first adjustment, set the horizontal drive trimmer C143B one-half turn out from maximum capacity.

Turn the horizontal linearity coil out until appreciable loss in width occurs, then in until nearly maximum width and the best linearity is obtained.

Adjust the width control R178 to obtain correct picture width.

A slight readjustment of these three controls may be necessary to obtain the best linearity.

HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS.—Adjust the height control (R153 on chassis rear apron) until the picture fills the mask vertically. Adjust vertical linearity (R157 on rear apron), until the test pattern is symmetrical from top to bottom. Adjustment of either control will require a readjustment of the other. Adjust centering to align the picture with the mask.

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

On focus magnets using two shunts, the one with the cable is the "fine adjustment" and the other is the "focus range" adjustment. In general, the two shunts should be adjusted to approximately equal positions.

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

Check to see that the cushion and yoke thumbscrews and the focus coil mounting screws are tight.

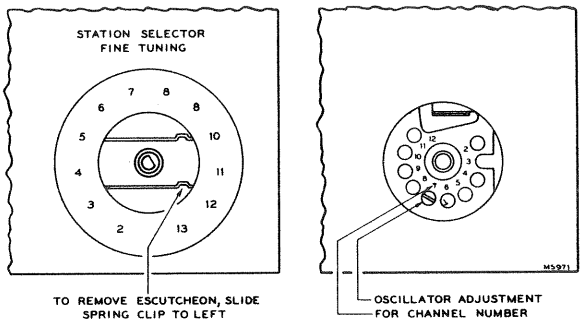


Figure 4—R-F Oscillator Adjustments

CHECK OF R-F OSCILLATOR ADJUSTMENTS.—Tune in all available stations to see if the receiver r-f oscillator is adjusted to the proper frequency on all channels. If adjustments are required, these should be made by the method outlined in the alignment procedure on page 9. The adjustments for channels 2 through 12 are available from the front of the cabinet by removing the station selector escutcheon as shown in Figure 4. Adjustment of channel 13 is on top of the chassis.

AGC CONTROL.—The AGC control switch is provided as an installation adjustment. The normal position for strong signal areas is with the switch in the number 1 or counter-clockwise position. If impulse type of interference is experienced, turn the switch to the number 2 or center position. In very weak signal areas in which impulse type interference is experienced, turn the switch to position number 3 or fully clockwise. In this position, all AGC is removed and the receiver will overload if the input signal exceeds 200 microvolts. However, for signals under 200 microvolts, this position of the AGC control switch gives best noise immunity of sync.

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 L203 core on top of the r-f unit for minimum interference in the picture.

CAUTION: In some receivers, the FM trap L203 will tune down into channel 6 or even into channel 5. Needless to say, such an adjustment will cause greatly reduced sensitivity on these channels. If channels 5 or 6 are to be received, check L203 to make sure that it does not affect sensitivity on these two channels.

Replace the cabinet back and reconnect the antenna leads to the cabinet back.

VENTILATION CAUTION.—The receiver is provided with adequate ventilation holes in the bottom and back of the cabinet. Care should be taken not to allow these holes to be covered or ventilation to be impeded in any way.

If the receiver is to be operated with the back of the cabinet near a wall, at least a two-inch clearance should be maintained between cabinet and wall.

CHASSIS REMOVAL.—To remove the chassis for repair or installation of a new kinescope, remove the cabinet back and the control knobs, unplug the speaker cable, and remove the four chassis bolts under the cabinet. Withdraw the chassis from the back of the cabinet. The kinescope is held on the chassis by means of a special strap, so that the chassis and the kinescope can be handled together, as a unit.

To remove the kinescope, remove the kinescope socket, the ion-trap magnet, and the second-anode connector. Loosen the cross-recessed head screw on the kinescope strap. Withdraw the kinescope toward the front of the chassis.

INSTALLATION OF KINESCOPE.—The kinescope second anode contact is a recessed metal well in the side of the bulb. The tube must be installed so that this contact is up but rotated approximately 30 degrees toward the high-voltage compartment.

Insert the neck of the kinescope through the deflection yoke and focus magnet. If the tube sticks, or fails to slip into place smoothly, investigate and remove the cause of the trouble. Do not force the tube.

Slide the kinescope cushion toward the rear of the chassis. Loosen the deflection yoke adjustment, slide the yoke toward the rear of the chassis and tighten.

Slip the ion trap magnet assembly over the neck of the kinescope.

Connect the kinescope socket to the tube base.

Connect the high voltage lead to the kinescope second anode socket.

Wipe the kinescope screen surface and front panel safety glass clean of all dust and finger marks.

To replace the chassis in the cabinet, first tighten the cross-recessed head screw on the kinescope strap. Slide the chassis into the cabinet, then insert and tighten the four chassis bolts. Loosen the kinescope strap from the rear of the cabinet. Push the kinescope forward until the face of the tube is against the mask. Push the yoke cushion forward against the kinescope flare, then tighten the cushion adjusting screws. Tighten the kinescope strap. Then replace the knobs, and the cabinet back.

ANTENNAS.—The finest television receiver built may be said to be only as good as the antenna design and installation. It is therefore important to select the proper antenna to suit the particular local conditions, to install it properly and orient it correctly.

If two or more stations are available between channels two and six and the two stations are in different directions, it may be possible to make a compromise orientation which will provide a satisfactory signal on all such channels.

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

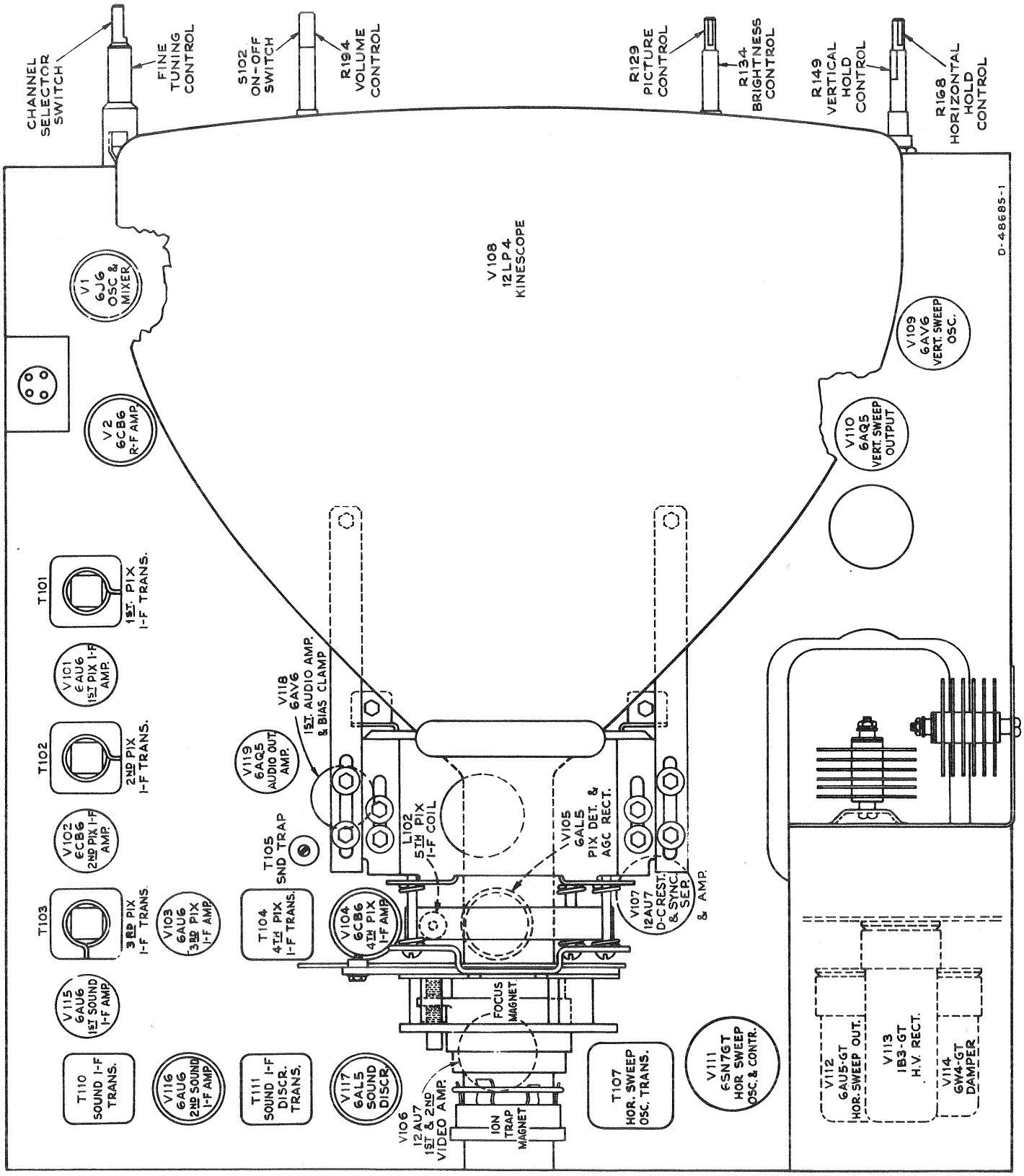


Figure 5—Chassis Top View

CHASSIS BOTTOM VIEW

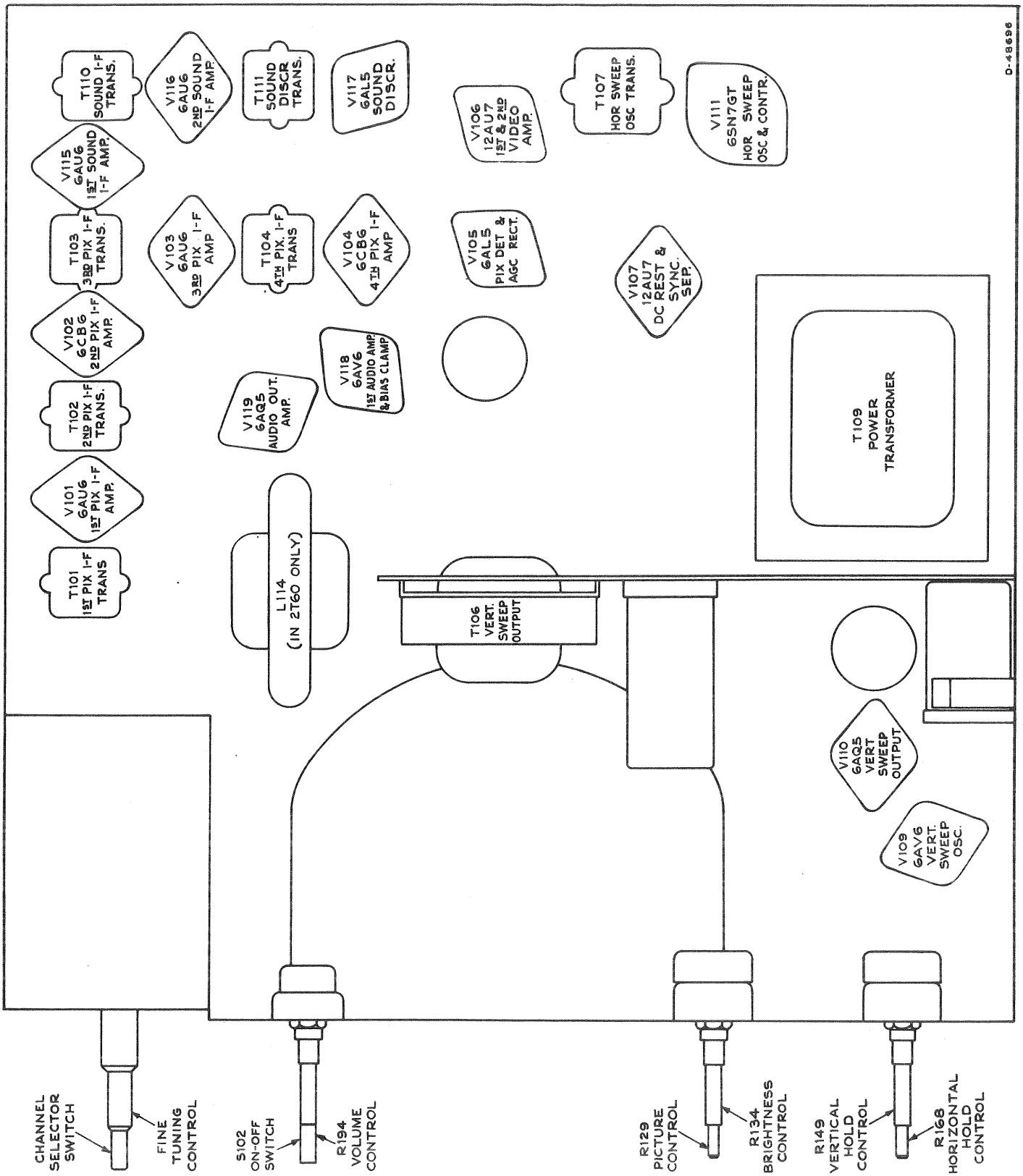


Figure 6—Chassis Bottom View

TEST EQUIPMENT.—To properly service the television chassis of this receiver, it is recommended that the following test equipment be available:

R-F Sweep Generator meeting the following requirements:

(a) Frequency Ranges

20 to 30 mc., 1 mc. and 10 mc. sweep width
50 to 90 mc., sweep width
170 to 225 mc., 10 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.

Cathode-Ray Oscilloscope.—For alignment purposes, the oscilloscope employed must have excellent low frequency and phase response, and should be capable of passing a 60-cycle square wave without appreciable distortion. While this requirement is not met by many commercial instruments, RCA Oscilloscopes, types WO-55A, WO-58A, WO-79A, and WO-60C fill the requirement and any of these may be employed.

For video and sync waveform observations, the oscilloscope must have excellent frequency and phase response from 10 cycles to at least two megacycles in all positions of the gain control. The RCA types WO-58A and WO-79A are ideally suited for this purpose.

Signal Generator to provide the following frequencies with crystal accuracy.

(a) Intermediate frequencies

19.50 mc. adjacent channel picture trap
21.00 mc. sound i-f and sound traps
22.3 and 25.4 mc. conv. and first pix i-f trans.
25.3 mc. second picture i-f transformer
22.5 mc. fourth picture i-f transformer
21.75 mc. third picture i-f transformer
24.35 mc. fifth picture i-f coil
25.50 mc. picture carrier
27.00 mc. adjacent channel sound trap

(b) Radio frequencies

Channel Number	Picture Carrier Freq. Mc.	Sound Carrier Freq. Mc.
2	55.25	59.75
3	61.25	65.75
4	67.25	71.75
5	77.25	81.75
6	83.25	87.75
7	175.25	179.75
8	181.25	185.75
9	187.25	191.75
10	193.25	197.75
11	199.25	203.75
12	205.25	209.75
13	211.25	215.75

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

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

Electronic Voltmeter of Junior "VoltOhmyst" type and a high voltage multiplier probe for use with this meter to permit measurements up to 10 kv.

Service Precautions.—If possible, the chassis should be serviced without the kinescope. However, if it is necessary to view the raster during servicing, make sure the kinescope retaining strap is secure, and the yoke cushion is up firmly against the flare of the tube.

CAUTION: Do not short the kinescope second anode lead. Its short circuit current is approximately 3 ma. This respresents approximately 9 watts dissipation and a considerable overload on the high voltage filter resistor R179.

Adjustments Required.—Normally, only the r-f oscillator and mixer lines will require the attention of the service technician. All other circuits are either broad or very stable and hence will seldom require readjustment.

ORDER OF ALIGNMENT.—When a complete receiver alignment is necessary, it can be most conveniently performed in the following order:

(1) Sound discriminator
(2) Sound i-f transformers
(3) Picture i-f traps
(4) Picture i-f transformers
(5) R.F. unit
(6) Overall picture i-f
(7) Horizontal oscillator
(8) Sensitivity check

SOUND DISCRIMINATOR ALIGNMENT.—Set the signal generator for approximately .1 volt output at 21.00 mc. and connect it to the second sound i-f grid, pin 1 of V116.

Detune T111 secondary (bottom) to the extreme counterclockwise position.

Set the "VoltOhmyst" on the 3-volt scale.

Connect the meter, in series with a one-megohm resistor, to pin 7 of V117.

Adjust the primary of T111 (top) for maximum output on the meter.

Connect the "VoltOhmyst" to the junction of R192 and S103. Adjust T111 secondary (bottom). It will be found that it is possible to produce a positive or negative voltage on the meter dependent upon this adjustment. Obviously to pass from a positive to a negative voltage, the voltage must go through zero. T111 (bottom) should be adjusted so that the meter indicates zero output as the voltage swings from positive to negative. This point will be called discriminator zero output.

Connect the sweep oscillator to the grid of the second sound i-f amplifier, pin 1 to V116.

Adjust the sweep band width to approximately 1 mc. with the center frequency at approximately 21.00 mc. and with an output of approximately .1 volt.

Connect the oscilloscope to the junction of R192 and S103. The pattern obtained should be similar to that shown in Figure 12. If it is not, adjust T111 (top) until the wave form is symmetrical.

The peak-to-peak band width of the discriminator should be approximately 400 kc. and the trace should be linear from 20.925 mc. to 21.075 mc.

Note.—The bottom core and stud in the discriminator transformer are at plus B potential.

SOUND I-F ALIGNMENT.—Connect the sweep oscillator to the first sound i-f amplifier grid, pin 1 of V115.

Insert a 21.00 mc. marker signal from the signal generator into the first sound i-f grid.

With the oscilloscope connected as above, adjust T110 for maximum gain and symmetry about the 21.00 mc. marker on the discriminator pattern. The pattern obtained should be similar to that shown in Figure 12.

The output level from the sweep should be set to produce approximately 1.0 volt peak-to-peak at the junction of R192 and S103, when the final touches on the above adjustment are made. It is necessary that the sweep output voltage should not exceed the specified values otherwise the response curve will be broadened, permitting slight misadjustment to pass unnoticed and possibly causing distortion on weak signals.

The band width at 70% response from the first sound i-f grid to the second i-f grid should be approximately 530 kc.

PICTURE I-F TRAP ADJUSTMENT.—Connect the "VoltOhmyst" to the junction of R102 and R103.

Obtain a 7.5 volt battery capable of withstanding appreciable current drain and connect the ends of a 1,000 ohm potentiometer across it. Connect the battery positive terminal to chassis and the potentiometer arm to the junction of R102 and R103. Adjust the potentiometer for –3.0 volts indication on the "VoltOhmyst."

Set the channel switch to the blank position between channels number 2 and 13.

Connect the "VoltOhmyst" to pin 2 of V106 and to ground.

Connect the output of the signal generator to terminal D of T101.

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

(1) 21.00 mc.—T103 (top)
(2) 21.00 mc.—T105 (top)
(3) 27.00 mc.—T102 (top)
(4) 27.00 mc.—T104 (top)
(5) 19.50 mc.—T101 (top)

In the above transformers using threaded cores, it is possible to run the cores completely through the coils and secure two peaks or nulls. The correct position is with the cores in the outside ends of the coils. If the cores are not in the correct position, the coupling will be incorrect and it will be impossible to secure the correct response.

PICTURE I-F TRANSFORMER ADJUSTMENTS.—Set the signal generator to each of the following frequencies and peak the specified adjustment for maximum indication on the "VoltOhmyst." During alignment, reduce the input signal if necessary to prevent overloading.

*24.35 mc.—L102
*22.5 mc.—T104 (bottom)
21.75 mc.—T103 (bottom)
25.3 mc.—T102 (bottom)

* In some receivers R115 was 3900, R119 was 8,200, and L114 was omitted, T104 bottom was tuned to 24.35MC and L102 was tuned to 22.5MC.

R-F UNIT ALIGNMENT.—Disconnect the co-ax link from terminal 2 of the r-f unit terminal board and connect a 39 ohm composition resistor between lugs 1 and 2.

Detune T1 by backing the core all the way out of the coil.

In early production units in which L44 is adjustable, back the L44 core all the way out. Back L203 core all the way out.

In order to align the r-f tuner, it will first be necessary to set the channel 13-oscillator to frequency. The shield over the bottom of the r-f unit must be in place when making any adjustments.

The oscillator may be aligned by adjusting it to beat with a crystal-calibrated heterodyne frequency meter, or by feeding a signal into the receiver at the r-f sound carrier frequency and adjusting the oscillator for zero output from the sound discriminator. In this latter case the sound discriminator must first have been aligned to exact frequency. Either method of adjustment will produce the same results. The method used will depend upon the type of test equipment available. Regardless of which method of oscillator alignment is used, the frequency standard must be crystal controlled or calibrated.

If the receiver oscillator is to be adjusted by the heterodyne frequency meter method, couple the meter probe loosely to the receiver oscillator.

If the receiver oscillator is adjusted by feeding in the r-f sound carrier signal, connect the signal generator to the receiver antenna terminals. Connect the "VoltOhmyst" to the sound discriminator output (junction of R192 and S103). Also couple the link loosely to lug 2 of the r-f unit terminal board so as to permit measurement at sound discriminator.

Set the channel selector switch to 13.

Adjust the frequency standard to the correct frequency (236.75 mc. for heterodyne frequency meter or 215.75 mc. for the signal generator).

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

Adjust C1 for an audible beat on the heterodyne frequency meter or zero voltage from sound discriminator.

Now that the channel-13 oscillator is set to frequency, we may proceed with the r-f alignment.

Turn the AGC control to the counter-clockwise position.

Connect the bias box to terminal 3 of the r-f unit terminal board and adjust the bias box potentiometer for –3.5 volts.

Connect the oscilloscope to the test connection at R5 on top of the r-f unit.

Connect the r-f sweep oscillator to the receiver antenna terminals. The method of connection depends upon the output impedance of the sweep. The P300 connections for 300-ohm balanced or 72-ohm single-ended input are shown in the circuit schematic diagram on page 27. If the sweep oscillator has a 50-ohm single-ended output, 300-ohm balanced output can be obtained by connecting as shown in Figure 7.

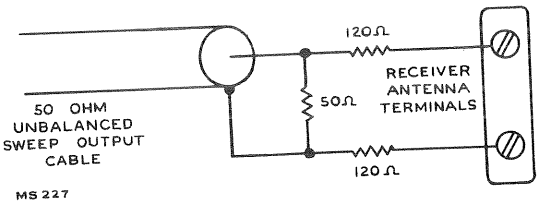


Figure 7—Unbalanced Sweep Cable Termination

Connect the signal generator loosely to the receiver antenna terminals.

Set the receiver channel switch to channel 8.

Set the sweep oscillator to cover channel 8.

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

Adjust C9, C11, C16 and C22 for approximately correct curve shape, frequency, and band width as shown in Figure 15.

The correct adjustment of C22 is indicated by maximum amplitude of the curve midway between the markers. C16 tunes the r-f amplifier plate circuit and affects the frequency of the curve most noticeably. C9 tunes the converter grid circuit and affects the tilt of the curve most noticeably (assuming that C22 has been properly adjusted). C11 is the coupling adjustment and hence primarily affects the response band width.

Set the receiver channel switch to channel 6.

Adjust the frequency standard to the correct frequency (108.75 mc. for heterodyne frequency meter or 87.75 mc. for the signal generator).

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

Adjust L5 for an audible beat on the heterodyne frequency meter or zero voltage from sound discriminator.

Set the sweep generator to channel 6.

From the signal generator, insert channel 6 sound and picture carrier markers, 83.25 mc. and 87.75 mc.

Adjust L42, L45 and L49 for proper response as shown in Figure 15.

L42 is adjusted to give maximum amplitude of the curve between the markers. L45 primarily affects the tilt of the curve. L49 primarily affects the frequency of response.

Connect the "VoltOhmyst" to the r-f unit test point at R5.

Adjust C7 for –3.0 volts at the test point.

Retouch L42, L45 and L49 for proper response if necessary. If necessary, retouch C11 for proper band width on channel 6. Continue these retouching adjustments until proper response is obtained and –3.0 volts of oscillator injection are present at the test point.

Set the receiver channel selector switch to channel 8 and readjust C1 for proper oscillator frequency.

Set the sweep oscillator and signal generator to channel 8.

Readjust C9, C16 and C22 for correct curve shape, frequency and band width. Readjust C11 only if necessary.

Switch the receiver, the sweep oscillator and signal generator to channel 13.

Adjust L52 for maximum amplitude of the curve midway between markers and then overshoot the adjustment by turning the slug in the same direction from thte initial setting a little more than the amount of turning required to reach maximum amplitude of response.

Adjust C22 for maximum amplitude of response.

Turn off the sweep generator. Adjust the L43 core for correct channel 13 oscillator frequency, then overshoot the adjustment by turning the slug a little more in the same direction from the initial setting. Reset the oscillator to proper frequency by adjustment of C1.

Turn the sweep oscillator back on.

Check the response of channels 7 through 13 by switching the receiver channel switch, sweep oscillator and marker oscillator to each of these channels and observing the response and oscillator injection obtained. See Figure 15 for typical response curves. It should be found that all these channels have the proper shaped response with the markers above 80% response.

If the markers do not fall within this requirement, switch to channel 8 and readjust C9, C11, C16 and C22 as necessary. If C22 required adjustment, the adjustment should be overshot a small amount and corrected by adjustment of L52 to give maximum amplitude of response between the sound and picture carrier markers. The antenna circuit (L52, C22) is broad so that tracking is not particularly critical.

If the valley in the top of the selectivity curves for the high channels is deeper than normal, the curve can be flattened somewhat by decreasing the inductance of L44 by turning the core stud in. Be sure to check for undesirable resonant suckouts on channels 7 and 8 if this is done. In later production units, L44 may be fixed and not require adjustment.

Turn the sweep oscillator off and check the receiver channel 8 r-f oscillator frequency. If the oscillator is off frequency overshoot the adjustment of C1 and correct by adjusting L43.

Turn the receiver channel selector switch to channel 6. Adjust L5 for correct oscillator frequency.

Turn the sweep oscillator on and to channel 6 and observe the response curve. If necessary readjust L42, L45 and L49. It should not be necessary to touch C11.

Check the oscillator injection voltage at the test point. If necessary adjust C7 to give –3 volts injection. If C7 is adjusted, switch to channel 8, and readjust C9 for proper curve shape, then recheck channel 6.

Switch the receiver through channel 6 down through channel 2 and check for normal reponse curve chapes and oscillator injection voltage.

Likewise check channels 7 through 13, stopping on 13 for the next step.

With the receiver on channel 13, check the receiver oscillator frequency. Correct by adjustment of C1 if necessary.

Adjust the oscillator to frequency on all channels by switching the receiver and the frequency standard to each channel and adjusting the appropriate oscillator trimmer for the specified indication. It should be possible to adjust the oscillator to the correct frequency on all channels with the fine tuning control in the middle third of its range.

Channel Number	Picture Carrier Freq. Mc.	Sound Carrier Freq. Mc.	Receiver R-F Osc. Freq. Mc.	Channel Oscillator Adjustment
2	55.25	59.75	80.750	L1
3	61.25	65.75	86.750	L2
4	67.25	71.75	92.750	L3
5	77.25	81.75	102.750	L4
6	83.25	87.75	108.750	L5
7	175.25	179.75	200.750	L6
8	181.25	185.75	206.750	L7
9	187.25	191.75	212.750	L8
10	193.25	197.75	218.750	L9
11	199.25	203.75	224.750	L10
12	205.25	209.75	230.750	L11
13	211.25	215.75	236.750	C1

Switch to channel 8 and observe the response.

Adjust T1 clockwise while watching the change in response. When T1 is properly adjusted, the selectivity curve will be slightly wider with a slightly deeper valley in its top.

Switch through all channels and observe response, oscillator injection and r-f oscillator frequency. Minor touch-ups of adjustments may be made at this time. However, if C7 or C9 are changed appreciably, then a recheck of the oscillator frequency on all channels should be made.

Reconnect the link from T101 to terminal 2 of the r-f unit terminal board.

Since T1 was adjusted during the r-f unit alignment it will be necessary to sweep the overall i-f response.

R-F UNIT TUBE CHANGES.—Since most of the circuits are low capacitance circuits the r-f unit may require readjustments when the tubes are changed.

If the 6CB6 r-f amplifier tube is changed, it may be necessary to readjust C16 and C22.

If the 6J6 oscillator and mixer tube is changed, then more extensive adjustments are required.

For good conversion efficiency, the oscillator injection to a triode mixer must be held reasonably close to the optimum value. Although there is some latitude in this level, it is nearly expended in the normal variation in injection from channel to channel. Consequently, the adjustment of C7 is limited primarily to establishing the conditions for good conversion. Since changes in oscillator injection affect conversion gain, it also affects the input capacity of the mixer, thus also affecting tracking of the mixer grid circuit. These tube variations with their consequent effect on circuit alignment thereby require readjustment of the r-f unit if maximum conversion efficiency is to be retained after the 6J6 tube is changed. It may be possible, however, to try several 6J6 tubes and select one which gives satisfactory performance without realignment.

SWEEP ALIGNMENT OF PIX I-F.—Set the r-f unit bias to –3.5 volts.

Connect a 47 ohm resistor across the link circuit at T101 terminals C and D.

Remove the second picture i-f tube.

With the oscilloscope connected to the r-f unit test connection and the sweep oscillator connected to the antenna terminals, set the sweep output to give 0.1 volt peak-to-peak on the oscilloscope.

Switch through the channels and select one that is essentially flat and with the two carriers at 90% response or higher. Channel 6 is usually the most desirable for this test.

Remove the 47 ohm resistor and replace V102

Connect the oscilloscope to terminal 2 of V106 socket.

Clip 330 ohm resistors across R107, R110, R115 and R119.

Connect the bias box to the junction of R102 and R103. Adjust the box for –1 volt.

Adjust the sweep oscillator output to give 0.5 volt peak-to-peak on the oscilloscope.

Connect the signal generator loosely to the i-f amplifier.

Adjust T1 and T101 bottom core to obtain the response curve shown in Figure 13.

Remove the 330 ohm resistors across R107, R110, R115 and R119.

Set the i-f bias to –4.5 volts.

Adjust the sweep output to give 3 volts peak-to-peak on the oscilloscope.

Retouch T1, T101 bottom, T102 bottom, T103 bottom, T104 bottom and L102 to obtain the response curve shown in Figure 14.

Continued on Page 13.

2T51, 2T60

ALIGNMENT TABLE

THE DETAILED ALIGNMENT PROCEDURE BEGINNING ON PAGE 7 SHOULD BE READ BEFORE ALIGNMENT BY USE OF THE TABLE IS ATTEMPTED

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
	DISCRIMINATOR AND SOUND I-F ALIGNMENT								
1	2nd sound i-f grid (pin 1, V116)	21.00 .1 volt output	Not used	—	Not used.	In series with 1 meg. to pin 7 of V117	Meter on 3 volt scale	Detune T111 (bot.) Adjust T111 (top) for max. on meter	Fig. 12 Fig. 9 Fig. 8
2	"	"	"	—	"	Junction of R192 & S103	Meter on 3 volt scale	T111 (bottom) for zero on meter	Fig. 12 Fig. 9
3	"	"	2nd sound i-f grid (pin 1, V116)	21.00 center 1 mc. wide .1 v. out	Junction of R192 & S103	Not used	Check for symmetrical response waveform (positive & negative). If not equal adjust T111 (top) until they are equal		Fig. 12 Fig. 9
4	1st sound i-f grid (pin, 1, V115)	21.00 reduced output	1st sound i-f grid (pin 1, V115)	21.00 reduced output	"	"	Sweep output reduced to provide 1.0 volt p-to-p on scope	T110 for max. gain and symmetry at 21.00 mc.	Fig. 12 Fig. 10 Fig. 8
	PICTURE I-F AND TRAP ADJUSTMENT								
5	Not used		Not used	—	Not used	Junction of R102 & R103	Connect bias box to junction of R102 & R103 and to ground	Adjust potentiometer for −3.0 volts on meter	Fig. 10
6	Terminal D of T101	21.00	"	—	"	Pin 2 of V106 and to ground	Meter on 3 volt scale. Receiver between 2 & 13	T103 (top) for min. on meter	Fig. 10 Fig. 8
7	"	21.00	"	—	"	"	"	T105 (top) for min.	Fig. 8
8	"	27.00	"	—	"	"	"	T102 (top) for min.	"
9	"	27.00	"	—	"	"	"	T104 (top) for min.	"
10	"	19.50	"	—	"	"	"	T101 (top) for min.	"
11	"	24.35	"	—	"	"	"	L102 (top) for max.	"
12	"	22.5	"	—	"	"	"	T104 (bot.) for max.	Fig. 9
13	"	21.75	"	—	"	"	"	T103 (bot.) for max.	"

R-F UNIT ALIGNMENT

STEP. No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT HETERODYNE FREQ. METER TO	HET. METER FREQ. MC.	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
14	Disconnect the co-ax link from terminal 2 of the r-f unit terminal board and connect a 39 ohm composition resistor between lugs 1 and 2. If the receiver oscillator is adjusted by feeding in the r-f sound carrier signal, couple the link loosely to lug 2 of the r-f unit terminal board so as to permit measurement at sound discriminator. In early production units in which L44 is adjustable, back the L44 core all the way out. Detune T1 by backing the core all the way out of the coil. In order to align the r-f tuner, it will first be necessary to set the channel 13 oscillator to frequency. The shield over the bottom of the r-f unit must be in place when making any adjustments.									
15	Antenna terminals	215.75 MC.	Not used		Loosely coupled to r-f oscillator	236.75 MC.	Junction of R192 & S103 for signal gen. method only	Fine tuning centered. Receiver on channel 13. Het. freq. meter coupled to osc. if used.	C1 for zero on meter or beat on het. freq. meter	Fig. 10 Fig. 8
16			"				Connect "Volt-Ohmyst" to terminal 3 of the r-f unit terminal board	Turn AGC control counter-clockwise. Connect bias box to terminal 3 of r-f unit term. board	Adjust the bias box potentiometer for −3.5 volts.	Fig. 10
17	Antenna terminal (loosely)	181.25 185.75	Antenna terminals (see text for precaution)	Sweeping channel 8	Not used	—	Not used	Rec. on chan. 8. Connect oscilloscope to test connection at R5 on top the r-f unit. Adjust C9, C11, C16 and C22. Correct curve shape, frequency, and band width. C22 is adjusted to give max. amplitude between markers. C9 primarily affects tilt and C16 primarily affects the frequency of response. C11 affects the response band width.		Fig. 15 (8)
18	"	87.75	"	Not used	Loosely coupled to r-f oscillator	108.75	Junction of R192 & S103 for signal gen. method only	Rec. on channel 6	L5 for zero on meter or beat on het. freq. meter	Fig. 8 Fig. 10 Fig. 11
19	"	83.25 87.75	"	Channel 6	Not used	—		Rec. on chan. 6. Adjust L42, L45 and L49 for proper response. L42 is adjusted to give max. amplitude between markers. L45 primarily affects tilt and L49 primarily affects freq. of response. If necessary, retouch C11 for proper width.		Fig. 15 (6)
20	Not used	—	Not used	—	Not used	—	Connect "Volt-Ohmyst" to r-f unit test point R5	Rec. on channel 6	Adjust C7 for −3.0 volts at the test point	Fig. 8 Fig. 9
21	Repeat steps 18, 19 and 20 until the specified conditions are obtained.									
22	Antenna terminal (loosely)	185.75	Not used	—	Loosely coupled to r-f oscillator	206.75	Junction of R192 & S103 for sig. gen. method only	Rec. on chan. 8	C1 for zero on meter or beat on het. freq. meter	Fig. 8 Fig. 10

ALIGNMENT TABLE

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT HETERODYNE FREQ. METER	HET. FREQ. METER MC.	CONNECT "VOLTOHMYST" TO	MISCELLLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
23	Antenna terminal (loosely)	181.25 185.75	Antenna terminals (see text for precaution)	Sweeping channel 8	Not used	—	Not used	Rec. on chan. 8. Readjust C9, C16 and C22 for correct curve shape, frequency and band width. Readjust C11 only if necessary.		Fig. 8 Fig. 9 Fig. 15 (8)
24	"	211.25 215.75	"	Sweeping channel 13	Not used	—	Not used	Rec. on chan. 13. Adjust L52 for max. amplitude between markers and then overshoot a little more than the amount of turning required to reach max. response. Adjust C22 to regain max. amplitude of response.		Fig. 9 Fig. 15 (13)
25	"	215.75	Not used	—	Loosely coupled to r-f oscillator	236.75	Junction of R192 & S103 for signal gen. method only	Fine tuning centered. Receiver on chan. 13. Adjust L43 for correct channel 13 osc. freq. then overshoot. Reset the osc. to proper freq. by adjustment of C1.		Fig. 10 Fig. 11
26	"	205.25 209.75	Antenna terminals (see text for precaution)	channel 12	Not used	—	Connect "Volt-Ohmyst" to r-f unit test point at R5	Rec. on chan. 12	Check to see that response is correct and −3.0 volts of osc. injection is present	Fig. 8 Fig. 15
27	"	199.25 203.75		channel 11	"	—	"	Rec. on chan. 11	"	Fig. 15 (11)
28	"	193.25 197.75	"	channel 10	"	—	"	Rec. on chan. 10	"	Fig. 15 (10)
29	"	187.25 191.75	"	channel 9	"	—	"	Rec. on chan. 9	"	Fig. 15 (9)
30	"	181.25 185.75	"	channel 8	"	—	"	Rec. on chan. 8	"	Fig. 15 (8)
31	"	175.25 179.75	"	channel 7	"	—	"	Rec. on chan. 7	"	Fig. 15 (7)
32	If the response of any channel (steps 26 through 31) is below 80% at either marker, repeat step 23 and adjust C9, C11, C16 and C22 as necessary to pull response up on the low channel yet maintain correct response on channel 8. If C22 required adjustment, the adjustment should be overshot a small amount and corrected by adjustment of L52 to give maximum amplitude of response between the sound and picture carrier markers.									
33	Repeat step 22. If the oscillator is off frequency overshoot the adjustment of C1 and correct by adjusting L43.									
34	Repeat steps 26 through 33 until all requirements are obtained.									
35	Antenna terminals (loosely)	87.75	Not used	—	Loosely coupled to r-f oscillator	108.75	Junction of R192 & S103 for sig. gen. method only	Rec. on chan. 6	L5 for zero on meter or beat on het. freq. meter	Fig. 10 Fig. 10
36	"	83.25 87.75	Ant. terminals (see text for precaution)	Sweeping channel 6	Not used	—	Not used	Observe response. If necessary readjust L42, L45 and L49. It should not be necessary to touch C11.		Fig. 8 Fig. 9 Fig. 15
37	Not used	—	Not used	—	Not used	—	Connect "Volt-Ohmyst" to the r-f unit test point at R5	Check osc. injection. If necessary adjust C7 to give −3 volts. If C7 is adjusted, switch to channel 8, and readjust C9 for proper response then repeat step 36.		Fig. 9 Fig. 10
38	Antenna terminals (loosely)	77.25 81.75	Ant. terminals (see text for precaution)	channel 5	"	—	"	Rec. on chan. 5	Check to see that response is correct and −3.0 volts of osc. injection is present	Fig. 15 (5)
39	"	67.25 71.75	"	channel 4	"	—	"	Rec. on chan. 4		Fig. 15 (9)
40	"	61.25 65.75	"	channel 3	"	—	"	Rec. on chan. 3	"	Fig. 15 (3)
41	"	55.25 59.75	"	channel 2	"	—	"	Rec. on chan. 2	"	Fig. 15 (2)
42	Likewise check channels 7 through 13, as outlined in steps 31 back through 26, stopping on channel 13 for next step.									
43	Antenna terminals	215.75	Not used	—	Loosely coupled to r-f oscillator	236.75	Junction of R192 & S103 for sig. gen. method only	Fine tuning centered. Receiver on channel 13	C1 for zero on meter or beat on het. freq. meter	Fig. 8 Fig. 10
44	"	209.75	"	—	"	230.75	"	Rec. on chan. 12	L11 as above	Fig. 11
45	"	203.75	"	—	"	224.75	"	Rec. on chan. 11	L10 as above	Fig. 11
46	"	197.75	"	—	"	218.75	"	Rec. on chan. 10	L9 as above	Fig. 11
47	"	191.75	"	—	"	212.75	"	Rec. on chan. 9	L8 as above	Fig. 11
48	"	185.75	"	—	"	206.75	"	Rec. on chan. 8	L7 as above	Fig. 11
49	"	179.75	"	—	"	200.75	"	Rec. on chan. 7	L6 as above	Fig. 11
50	"	87.75	"	—	"	108.75	"	Rec. on chan. 6	L5 as above	Fig. 11
51	"	81.75	"	—	"	102.75	"	Rec. on chan. 5	L4 as above	Fig. 11
52	"	71.75	"	—	"	92.75	"	Rec. on chan. 4	L3 as above	Fig. 11
53	"	65.75	"	—	"	86.75	"	Rec. on chan. 3	L2 as above	Fig. 11
54	"	59.75	"	—	"	80.75	"	Rec. on chan. 2	L1 as above	Fig. 11
55	Repeat steps 43 through 54 as a check.									
56	Antenna terminals	181.25 185.75	Antenna terminals	Sweeping channel 8	Not used	—		Rec. on chan. 8. Oscilloscope at R5 test point. Adjust T1 clockwise. When properly adjusted, curve will be slightly wider with a slightly deeper valley in top.		Fig. 15 (8)
57	Switch through all channels and observe response, oscillator injection and r-f oscillator frequency. Minor touch-ups of adjustments may be made at this time. However, if C7 or C9 are changed appreciably, then a recheck of the oscillator frequency on all channels should be made.									
58	Remove 39 ohm resistor and reconnect link from T101 to terminal 2 of r-f unit terminal board. Proceed with sweep alignment of Pix I-F.									

REFER TO
Fig. 8 Fig. 9 Fig. 15 (8)
Fig. 9 Fig. 15 (13)
Fig. 10 Fig. 11
Fig. 8 Fig. 15
Fig. 15 (11)
Fig. 15 (10)
Fig. 15 (9)
Fig. 15 (8)
Fig. 15 (7)
cessary overshot .
Fig. 10 Fig. 10
Fig. 8 Fig. 9 Fig. 15
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Fig. 15 (5)
Fig. 15 (9)
Fig. 15 (3)
Fig. 15 (2)
Fig. 8 Fig. 10
Fig. 11 Fig. 11 Fig. 11 Fig. 11 Fig. 11 Fig. 11 Fig. 11 Fig. 11 Fig. 11 Fig. 11 Fig. 11
Fig. 15 (8)
made

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
SWEEP ALIGNMENT OF PICTURE I-F AMPLIFIER									
59	Loosely coupled to i-f amplifier	22.3 25.4	Antenna terminals	Sweeping selected channel	Terminal 2 of V106 socket	Junction of R102 and R103	Select channel known to have good r-f response. Clip 330 ohm resistors across R107, R110, R115, R119. Connect bias box to junction R102, R103.	Adjust bias box for −1.0 v. Set sweep to give 0.5 v. p-p on oscilloscope. Adjust T1 and T101 for correct response.	Fig. 8 Fig. 9 Fig. 10 Fig. 13
60	"	21.85 24.75 25.50 26.25	"	"	"	"	Remove 330 ohm resistors. Set bias box for −4.5 v.	Set sweep to give 3.0 v. p-p on oscilloscope. Adjust T1, T101 bot., T102 bot., T103 bot., T104 bot. and L102 for desired response	Fig. 14

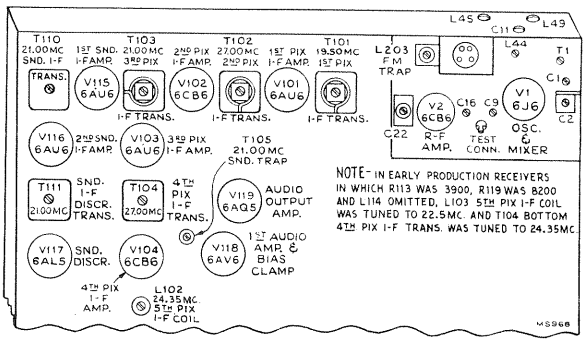


Figure 8—Top Chassis Adjustments

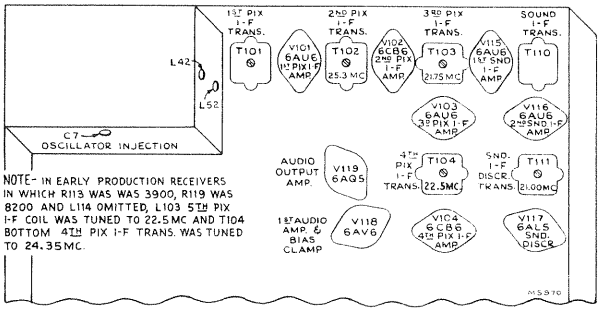


Figure 9—Bottom Chassis Adjustments

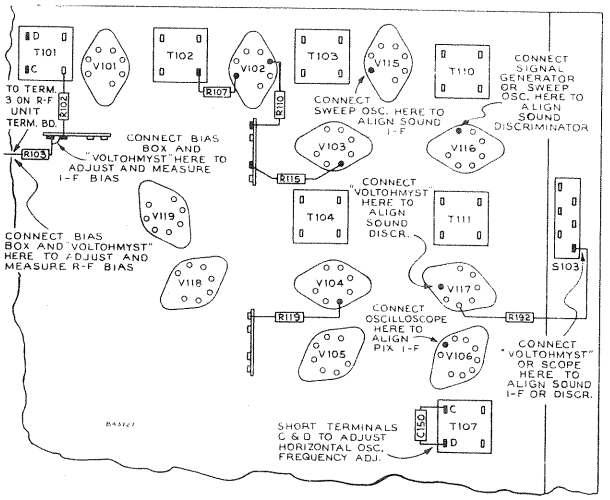


Figure 10—Test Connection Points

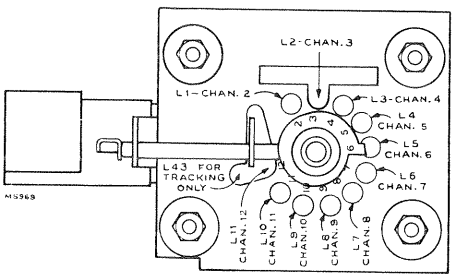


Figure 11—R-F Oscillator Adjustments

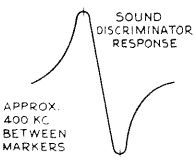


Figure 12 Discriminator Response

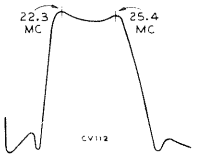


Figure 13 T1 and T101 Response

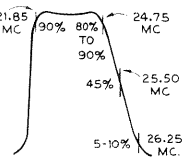


Figure 14 Overall I-F R-F Response

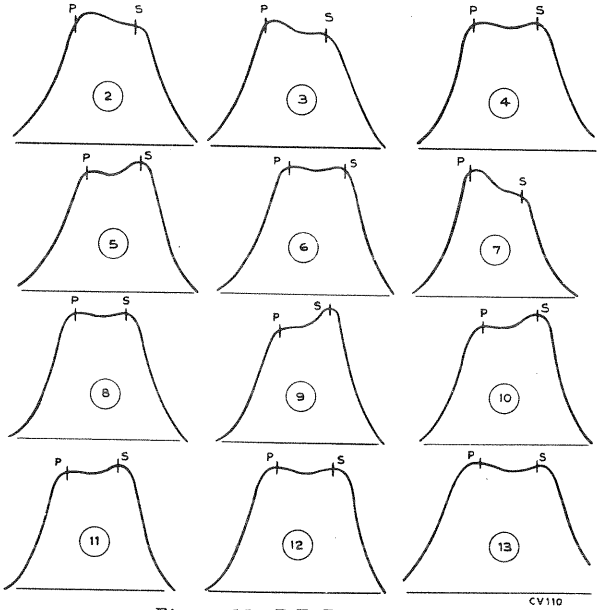


Figure 15—R-F Response

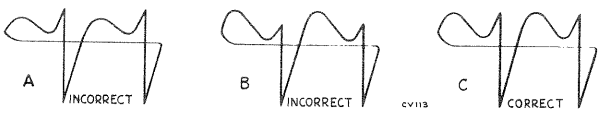


Figure 16—Horizontal Oscillator Waveforms

PICTURE I-F RESPONSE.—At times it may be desirable to observe the individual i-f stage response. This can be achieved by the following method:

Shunt all i-f transformers and coils with a 330 ohm carbon resistor except the one whose response is to be observed.

Connect a wide band sweep generator to the converter grid and adjust it to sweep from 18 mc. to 30 mc.

Connect the oscilloscope across the picture detector load resistor and observe the overall response. The response obtained will be essentially that of the unshunted stage. The effects of the various traps are also visible on the stage response.

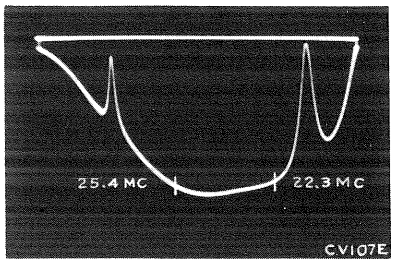


*Figure 17—**Response of Converter and First Pix I-F Transformer***

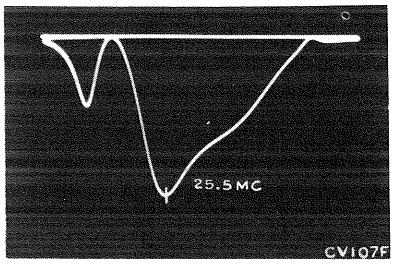


*Figure 18—**Response of Second Pix I-F Transformer***

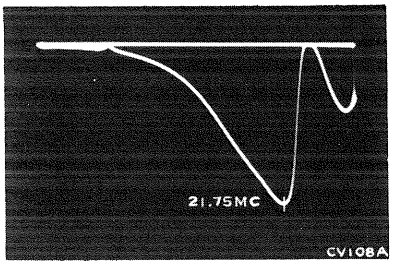


*Figure 19—**Response of Third Pix I-F Transformer***

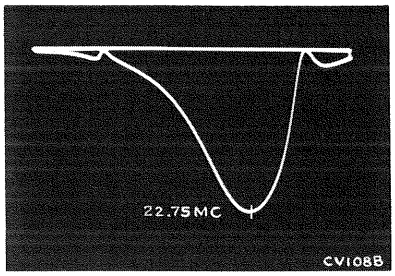


*Figure 20—**Response of Fourth Pix I-F Transformer***

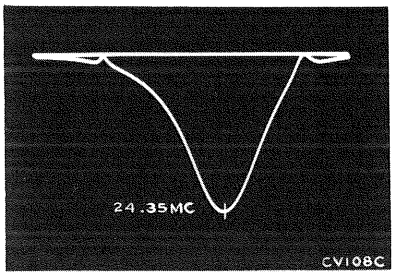


*Figure 21—**Response of Fifth Pix I-F Coil***

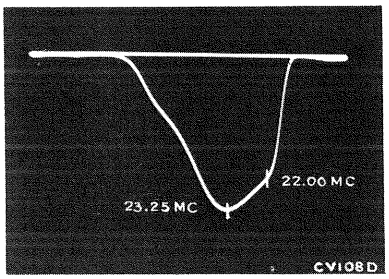


*Figure 22—**Response from First Pix I-F Grid to Pix Det.***

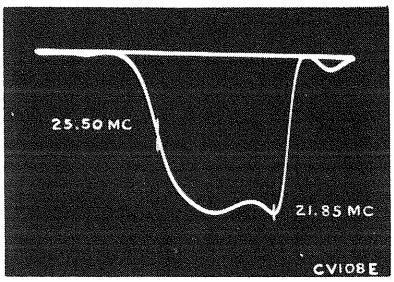


*Figure 23—**Overall Pix I-F Response***

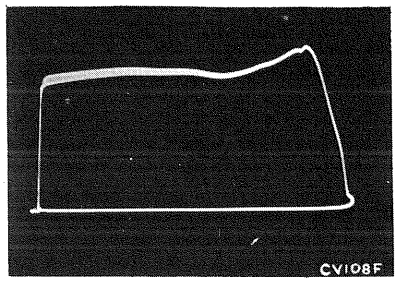


*Figure 24—**Video Response at Average Contrast***

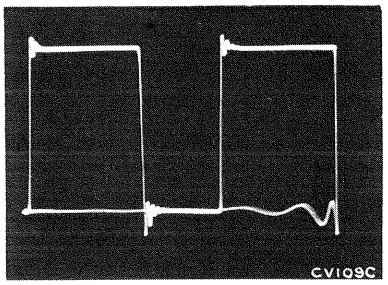


*Figure 25—**Video Response (100KC Square Wave)***

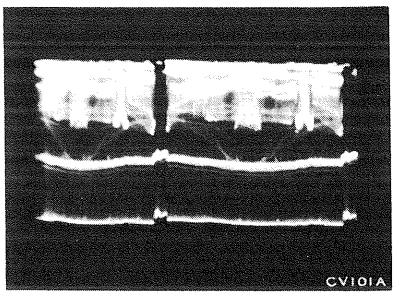
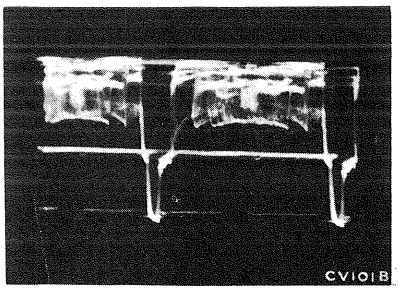
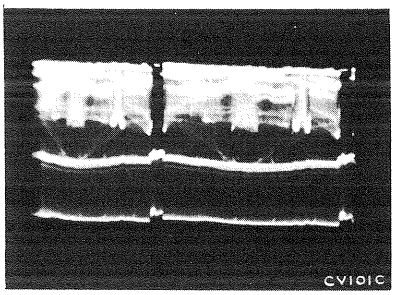


Plate of Picture Detector (Pin 2 of V105) (6AL5)

*Figure 26—**Vertical (Oscilloscope Synced to ½ of Vertical Sweep Rate) (5.5 Volts PP)***

*Figure 27—**Horizontal (Oscilloscope Synced to ½ of Horizontal Sweep Rate) (5.5 Volts PP)***

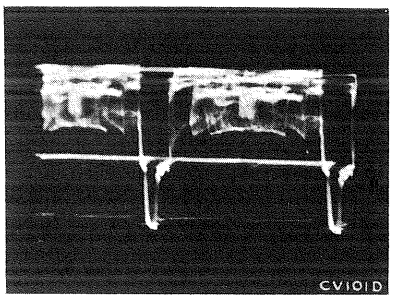




Grid of 1st Video Amplifier (Pin 2 of V106) (12AU7)

*Figure 28—**Vertical (5.3 Volts PP)***

*Figure 29—**Horizontal (5.3 Volts PP)***



Continued from Page 9

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

Horizontal Frequency Adjustment.—With a clip lead, short circuit the coil between terminals C and D of the horizontal oscillator transformer T107. Tune in a television station and sync the picture if possible.

A.—Turn the horizontal hold control R168 to the extreme clockwise position. Adjust the T107 Frequency Adjustment (atop the chassis) so that the picture is just out of sync and the horizontal blanking appears in the picture as a vertical bar. The position of the bar is unimportant.

B.—Turn the hold control approximately one-quarter of a turn from the extreme clockwise position and examine the width and linearity of the picture. If picture width or linearity is incorrect, adjust the horizontal drive control C143B, the width control R178 and the linearity control L113 until the picture is correct. If C143B, R178 or L113 were adjusted, repeat step A above.

Horizontal Locking Range Adjustment.—Turn the horizontal hold control fully counter-clockwise. The picture may remain in sync. If so, turn the T107 top core slightly and momentarily switch off channel. Repeat until the picture falls out of sync with the diagonal lines sloping down to the left. Momentarily remove the signal by switching off channel then back. 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 9 bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C143A slightly clockwise. If less than 7 bars are present, adjust C143A 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 7 to 9 bars are present.

Horizontal Oscillator Waveform Adjustment.—Remove the shorting clip from terminals C and D of T107. Turn the horizontal hold control to the extreme clockwise position. With a thin fibre screwdriver, adjust the Oscillator Waveform Adjustment Core of T107 (under the chassis) until the horizontal blanking bar appears in the center.

A.—Connect the low capacity probe of an oscilloscope to terminal C of T107. Turn the horizontal hold control one-quarter turn from the clockwise position so that the picture is in sync. The pattern on the oscilloscope should be as shown in Figure 16. Adjust the Oscillator Waveform Adjustment Core of T107 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 becomes more seroius. On the other hand, if the broad peak is higher than the sharp peak, the oscillator is overstabilized, the pull-in range becomes inadequate and the broad peak can cause double triggering of the oscillator when the hold control approaches the clockwise position.

Remove the oscilloscope upon completion of this adjustment.

Check of Horizontal Oscillator Adjustments.—Set the horizontal hold control to the full counter-clockwise position. Momentarily remove the signal by switching off channel then back. 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 C143A slightly clockwise. If less than 2 bars are present, adjust C143A 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 bars are present.

Turn the horizontal hold control to the maximum clockwise position. The picture should be just out of sync to the extent that the horizontal blanking bar appears as a single vertical or diagonal bar in the picture. Adjust the T107 Frequency Adjustment until this condition is fulfilled.

SENSITIVITY CHECK.—A comparative sensitivity check can be made by operating the receiver on a weak signal from a television station and comparing the picture and sound obtained to that obtained on other receivers under the same conditions.

This weak signal can be obtained by connecting the shop antenna to the receiver through a ladder type attenuator pad. The number of stages in the pad depends upon the signal strength available at the antenna. A sufficient number of stages should be inserted so that a somewhat less than normal contrast picture is obtained when the picture control is at the maximum clockwise position. Only carbon type resistors should be used to construct the pad.

RESPONSE CURVES.—The response curves shown on page 12 and referred to throughout the alignment procedure were taken from a production set. Although these curves are typical, some variations can be expected.

The response curves are shown in the classical manner of presentation, that is with "response up" and low frequency to the left. The manner in which they will be seen in a given test set-up will depend upon the characteristics of the oscilloscope and the sweep generator. The curves may be seen inverted and/or switched from left to right depending on the deflection polarity of the oscilloscope and the phasing of the sweep generator.

CHANGE OF I-F FREQUENCY.—Early production chassis were aligned with 21.25 mc. sound i-f and 25.75 mc. picture carrier i-f frequencies. See Television Supplement No. 2 for a discussion of i-f harmonic interference and its cure by change of i-f frequency.

NOTES ON R-F UNIT ALIGNMENT.—Because of the frequency spectrum involved and the nature of the device, many of the r-f unit leads and components are critical in some respects. Even the power supply leads form loops which couple to the tuned circuits, and if resonant at any of the frequencies involved in the performance of the tuner, may cause serious departures from the desired characteristics. In the design of the receiver these undesirable resonant loops have been shifted far enough away in frequency to allow reasonable latitude in their components and physical arrangement without being troublesome. When the r-f unit is aligned in the receiver, no trouble from resonant loops should be experienced. However, if the unit is aligned in a jig separate from the receiver, attention should be paid to insure that unwanted resonances do not exist which might present a faulty representation of r-f unit alignment.

A resonant circuit exists between the r-f tuner chassis and the outer shield box, which couples into the antenna and r-f plate circuits. The frequency of this resonance depends on the physical structure of the shield box, and the capacitance between the tuner chassis and the front plate. In the KRK8 units, this resonance should fall between 120 and 135 mc. and is controlled in the design by using insulating washers of different thicknesses (in the front plate to tuner chassis mounting) to compensate for differences in the shield boxes of different models of receivers. The performance of the tuner, particularly on channels 7 and 8 will be impaired if the proper washers for the particular shield box involved are not used. Obviously then, if the r-f unit is removed for service, the washers should be replaced in the correct order when the unit is replaced.

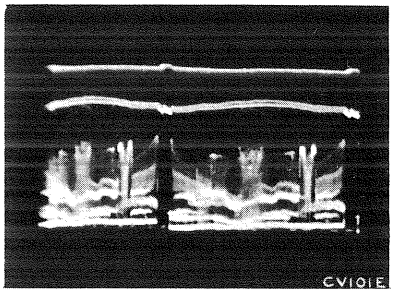
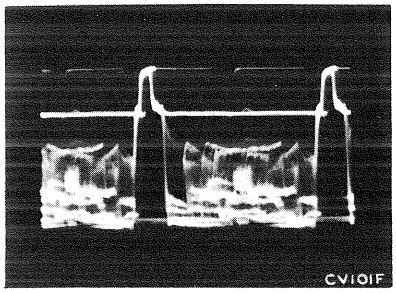
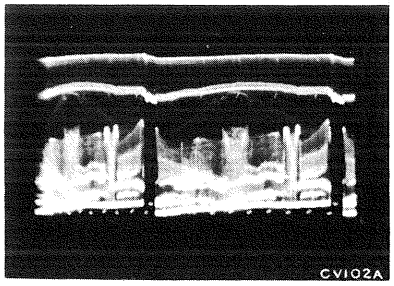


Plate of 1st Video Amplifier (Pin 1 of V106) (12AU7)
Voltages depend on setting of Pix control

Figure 30—Vertical (2-18 Volts PP)

Figure 31—Horizontal (2-18 Volts PP)

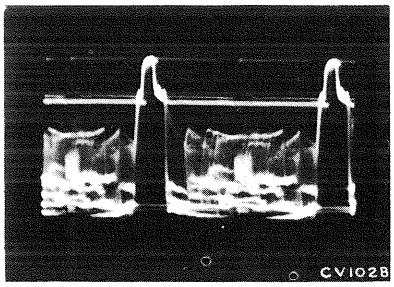




Grid of 2nd Video Amplifier (Pin 7 of V106) (12AU7)
Voltages depend on setting of Pix control

Figure 32—Vertical (2-18 Volts PP)

Figure 33—Horizontal (2-18 Volts PP)



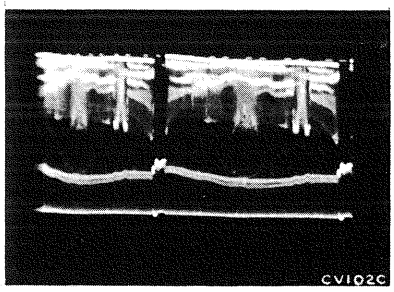
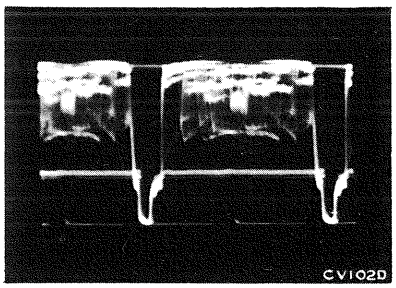
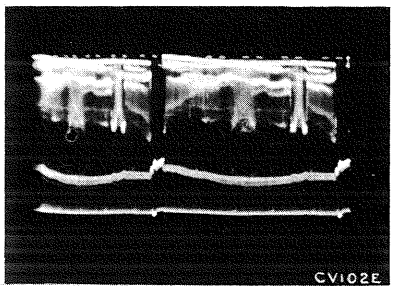


Plate of 2nd Video Amplifier (Picture Max.) (Pin 6 of V106) (12AU7)
Voltages depend on setting of Pix control

Figure 34—Vertical (15-90 Volts PP)

Figure 35—Horizontal (15-90 Volts PP)

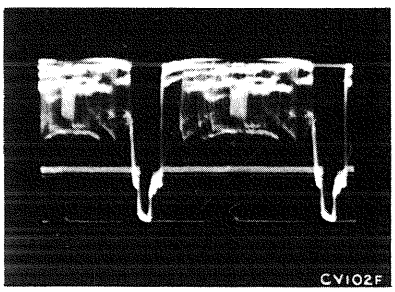


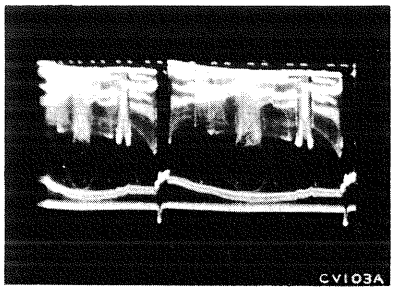


Input to Kinescope (Junction of R121 and C192) (Picture Max.)
Voltages depend on setting of Pix control

Figure 36—Vertical (15-90 Volts PP)

Figure 37—Horizontal (15-90 Volts PP)

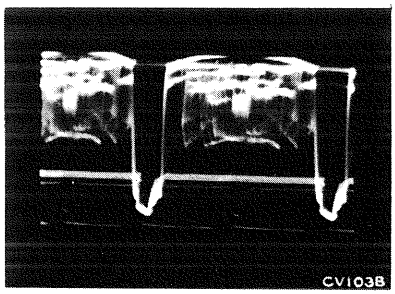


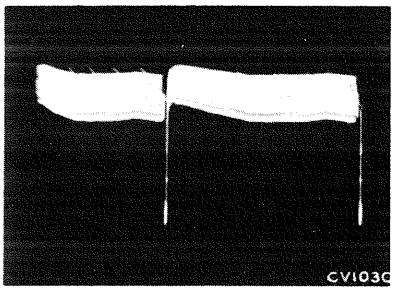


Cathode of D-C Restorer (Pin 3 of V107A) (12AU7)
Voltages depend on setting of Pix control

Figure 38—Vertical (11-80 Volts PP)

Figure 39—Horizontal (11-80 Volts PP)

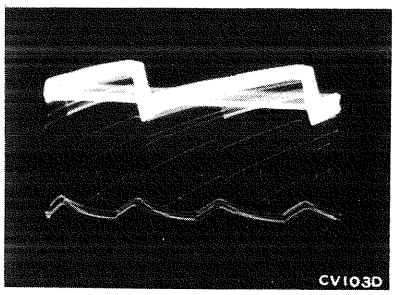




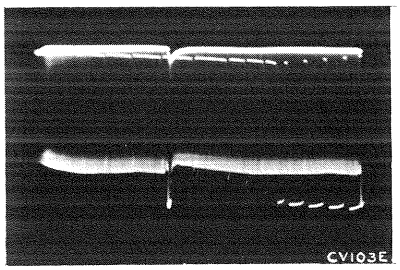
Grid of D-C Restorer (Pin 2 of V107A) (12AU7)
Voltages depend on setting of Pix control

Figure 40—Vertical (0.4-7.5 Volts PP)

Figure 41—Horizontal (0.4-7.5 Volts PP)



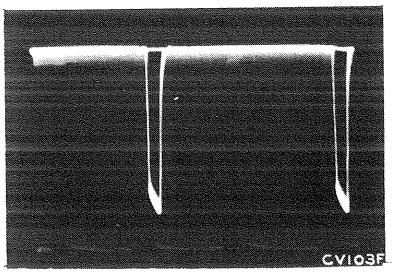
WAVEFORM PHOTOGRAPHS



Grid of Sync Separator (Pin 7 of V107B) (12AU7)
Voltages depend on setting of Pix control

Figure 42—Vertical (2.5-16 Volts PP)

Figure 43—Horizontal (2.5-16 Volts PP)



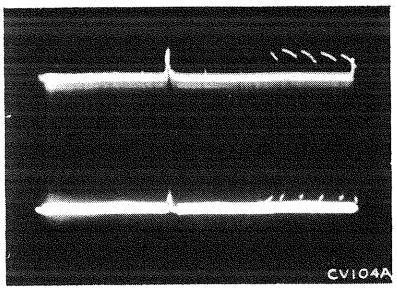
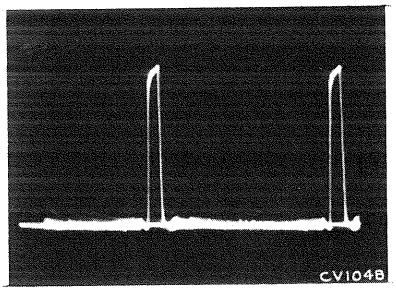
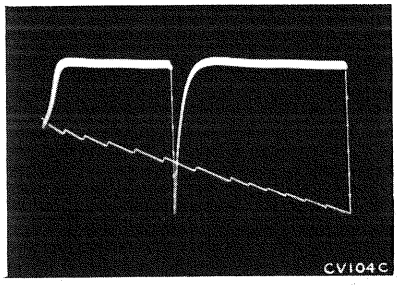


Plate of Sync Separator (Pin 6 of V107B) (12AU7)
Voltages depend on setting of Pix control

Figure 44—Vertical (18-22 Volts PP)

Figure 45—Horizontal (18-22 Volts PP)

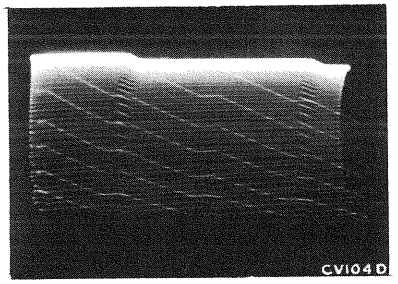




Cathode of Sync Separator (Pin 8 of V107B) (12AU7)
Voltages depend on setting of Pix control

Figure 46—Vertical (0.2-1.2 Volts PP)

Figure 47—Horizontal (0.2-1.2 Volts PP)



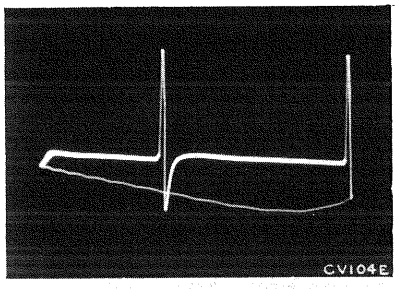
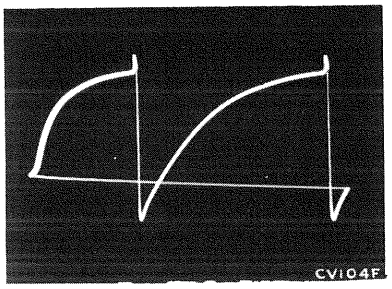


Figure 48—Output of Integrating Network (Junction of C139, C140 and R147) (8.5 Volts PP)

Figure 49—Grid of Vertical Oscillator (75 Volts PP) (Pin 1 of V109) (6AV6)



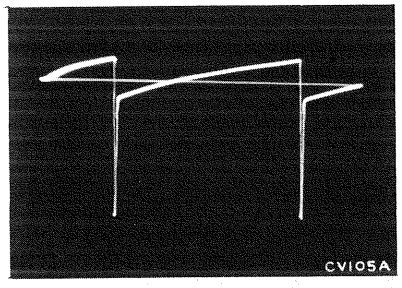
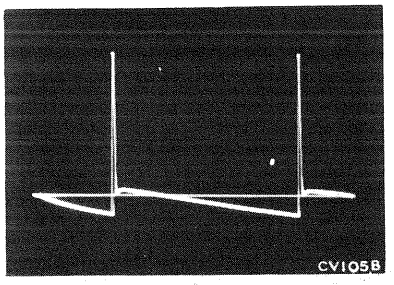


Figure 50—Grid of Vertical Output (90 Volts PP) (Pin 1 of V110) (6AQ5)

Figure 51—Plate of Vertical Output (600 Volts PP) (Pin 5 of V110) (6AQ5)



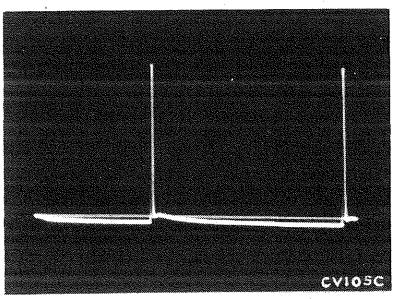
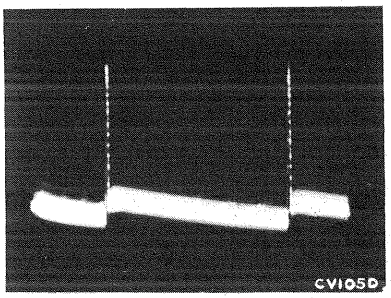


Figure 52—Junction of C159, C179 and R202 (275 Volts PP)

Figure 53—Input of Vertical Deflection Coils (20 Volts PP) (Junction of Green Lead of T106 and Green Lead of Yoke)



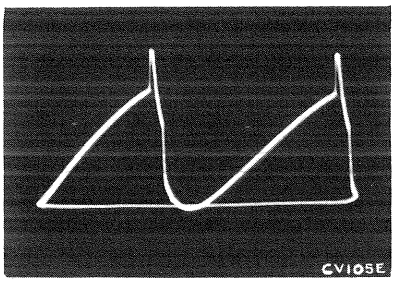


Figure 54—Grid of Horizontal Oscillator Control (27 Volts PP) (Pin 1 of V111) (6SN7GT)

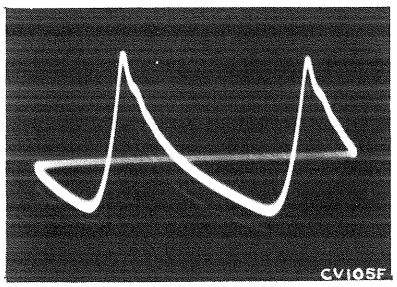


Figure 55—Cathode of Horizontal Oscillator Control (1.0 Volts PP) (Pin 3 of V111) (6SN7GT)

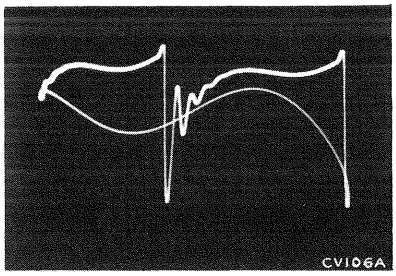


Figure 56—Junction of R163, R164 and R170 (70 Volts PP)

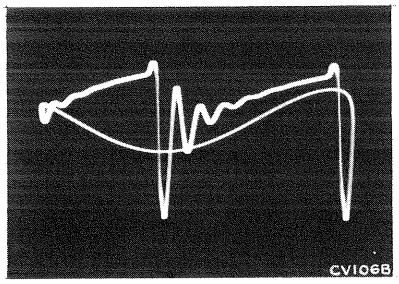


Figure 57—Grid of Horizontal Oscillator (290 Volts PP) (Pin 4 of V111) (6SN7GT)

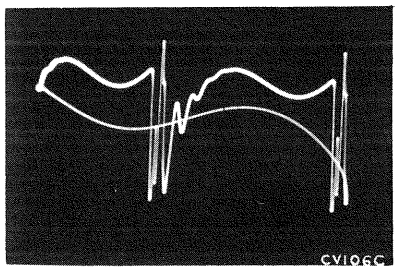


Figure 58—Plate of Horizontal Oscillator (150 Volts PP) (Pin 5 of V111) (6SN7GT)

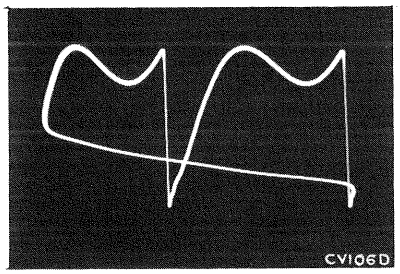


Figure 59—Terminal "C" of T107 (100 Volts PP)

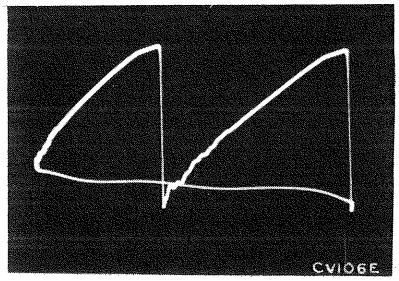


Figure 60—Input to Horizontal Output Tube (60-80 Volts PP) Depends on setting of drive control (Junction of C152 and C143B)

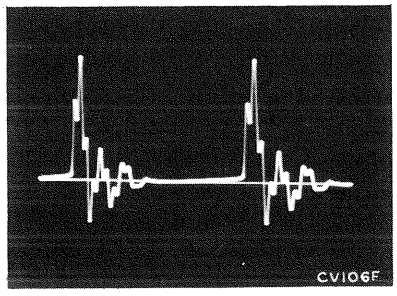


Figure 61—Plate of Horizontal Output (Approx. 5000 Volts PP) (Measured Through a Capacity Voltage Divider Connected from Top Cap of V112 to Ground)

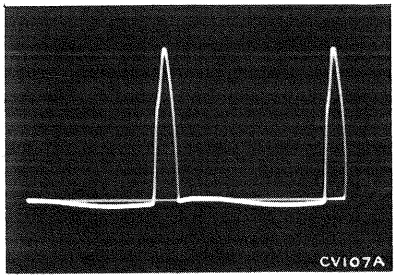


Figure 62—Cathode of Damper (2100-2700 Volts PP) Depends on setting of width control (Pin 3 of V114) (6W4GT)

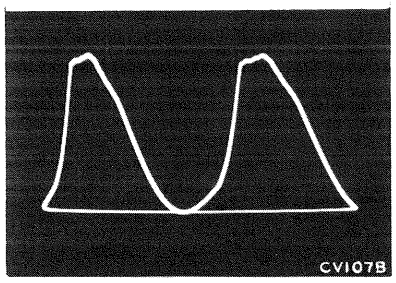


Figure 63—Plate of Damper (90-130 Volts PP) Depends on setting of width control (Pin 5 of V114) (6W4GT)

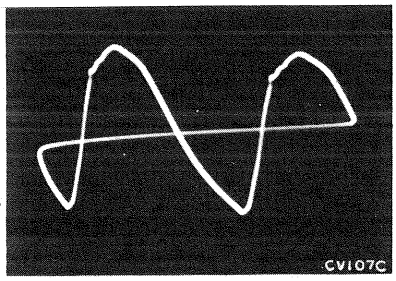


Figure 64—Junction of Yoke and Width Control (80-145 Volts PP) Depends on setting of width control

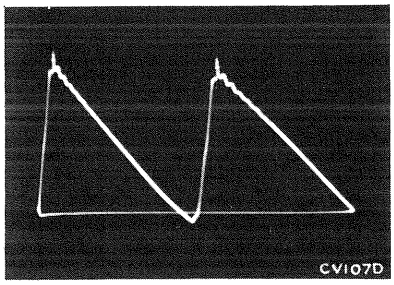


Figure 65—Voltage Across Width Control (0-85 Volts PP) Depends on setting of width control

2T51, 2T60

VOLTAGE CHART

The following measurements represent two sets of conditions. In the first condition, a 2500 microvolt test pattern signal was fed into the receiver, the picture synchronized and the AGC control properly adjusted. The second condition was obtained by removing the antenna leads and short circuiting the receiver antenna terminals. Voltages shown are read with a "Senior VoltOhmyst" type WV97A between the indicated terminal and chassis ground and with the receiver operating on 117 volts, 60 cycles, a-c. The symbol < means less than.

Tube No.	Tube Type	Function	Operating Condition	E. Plate		E. Screen		E. Cathode		E. Grid		I Plate (ma.)	I Screen (ma.)	Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts			
V1	6J6	Mixer	2500 Mu. V. Signal	2	135	—	—	7	0	5	−3.25	7.4	—	
			No Signal	2	130	—	—	7	0	5	−3.1	7.1	—	
V1	6J6	R-F Oscillator	2500 Mu. V. Signal	1	119	—	—	7	0	6	*−4.16	4.83	—	*Depending upon channel
			No Signal	1	104	—	—	7	0	6	*−2.37	4.6	—	
V2	6AG5	R-F Amplifier	2500 Mu. V. Signal	5	243	6	173	2	<0.1	1	−4.45	0.44	0.13	
			No Signal	5	197	6	114	2	0.28	1	−0.31	8.6	2.35	
V101	6AU6	1st Pix. I-F Amplifier	2500 Mu. V. Signal	5	205	6	232	7	0.15	1	−5.8	1.32	0.52	
			No Signal	5	112	6	152	7	1.0	1	−0.6	6.8	2.8	
V102	6CB6	2nd Pix. I-F Amplifier	2500 Mu. V. Signal	5	192	6	205	2	0.5	1	−5.8	4.4	0.8	
			No Signal	5	118	6	122	2	1.38	1	−0.6	9.8	2.5	
V103	6AU6	3d Pix. I-F Amplifier	2500 Mu. V. Signal	5	190	6	228	7	0.2	1	−0.6	1.28	0.55	
			No Signal	5	85	6	145	7	1.8	1	0	6.5	2.98	
V104	6CB6	4th Pix. I-F Amplifier	2500 Mu. V. Signal	5	159	6	148	2	1.8	1	0	9.3	2.7	
			No Signal	5	166	6	143	2	1.62	1	0	0.42	2.4	
V105	6AL5	Picture 2d Det.	2500 Mu. V. Signal	2	−2.3	—	—	5	0	—	—	8.2	—	
			No Signal	2	−0.52	—	—	5	0	—	—	<0.1	—	
V105	6AL5	AGC Rectifier	2500 Mu. V. Signal	7	−9.0	—	—	1	0	—	—	0.12	—	
			No Signal	7	−2.45	—	—	1	0	—	—	<0.1	—	
V106	12AU7	1st Video Amplifier	2500 Mu. V. Signal	1	100	—	—	3	1.0	2	−2.4	3.8	—	At maximum contrast
			No Signal	1	48	—	—	3	0.7	2	−0.38	2.7	—	
			2500 Mu. V. Signal	1	180	—	—	3	9.1	2	−2.9	0.69	—	At minimum contrast
			No Signal	1	100	—	—	3	5.9	2	−0.38	0.6	—	
V106	12AU7	2d Video Amplifier	2500 Mu. V. Signal	6	221	—	—	8	1.68	7	−6.2	7.5	—	At maximum contrast
			No Signal	6	191	—	—	8	2.6	7	−1.0	11.1	—	
			2500 Mu. V. Signal	6	189	—	—	8	2.75	7	−2.6	12.5	—	At minimum contrast
			No Signal	6	188	—	—	8	2.69	7	−0.4	12.3	—	
V107 A	12AU7	D-C Rest. & Sync Sep.	2500 Mu. V. Signal	1	4.6	—	—	3	48.0	2	−6.2	<0.1	—	At maximum contrast
			No Signal	1	2.8	—	—	3	4.6	2	−0.3	<0.1	—	

VOLTAGE CHART

Tube No.	Tube Type	Function	Operating Condition	E. Plate		E. Screen		E. Cathode		E. Grid		I Plate (ma.)	I Screen (ma.)	Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts			
V107 B	12AU7	Snyc Sep. & Amplifier	2500 Mu. V. Signal	6	44.1	—	—	8	5.9	7	5.69	2.47	—	
			No Signal	6	42.8	—	—	8	6.1	7	6.1	2.58	—	
V108	12LP4	Kinescope	2500 Mu. V. Signal	Cap	*10,000	10	405	11	69	2	34	0.075	—	*Average Brightness
			No Signal	Cap	*10,000	10	405	11	40	2	9.5	0.04	—	*Average Brightness
V109	6AV6	Vertical Oscillator	2500 Mu. V. Signal	7	93	—	—	2	0	1	−11.2	0.15	—	
			No Signal	7	93	—	—	2	0	1	−11.1	0.15	—	
V110	6AQ5	Vertical Output	2500 Mu. V. Signal	5	250	6	250	2	19.0	1	0	13.9	1.20	
			No Signal	5	248	6	248	2	18.8	1	0	13.8	1.20	
V111	6SN7 GT	Horizontal Osc. Control	2500 Mu. V. Signal	2	185	—	—	3	25.0	1	−2.0	.33	—	
			No Signal	2	181	—	—	3	16.3	1	−2.9	.31	—	
V111	6SN7 GT	Horizontal Oscillator	2500 Mu. V. Signal	5	161	—	—	6	0	4	−53	1.35	—	
			No Signal	5	158	—	—	6	0	4	−54	1.35	—	
V112	6AU5 GT	Horizontal Output	2500 Mu. V. Signal	5	*440	8	189	3	19.0	1	−8.0	77.0	11.2	***5000 volt pulse present**
			No Signal	5	*435	8	185	3	18.6	1	−7.4	75.0	11.0	
V113	1B3GT /8016	H. V. Rectifier	Brightness Min.	Cap	*	—	—	2 & 7	*10,100	—	—	0.075	—	*10,100 volt pulse present
			Brightness Average	Cap	*	—	—	2 & 7	*10,100	—	—	0.040	—	
V114	6W4 GT	Damper	2500 Mu. V. Signal	5	269	—	—	3	*430	—	—	88	—	*3000 volt pulse present
			No Signal	5	264	—	—	3	*429	—	—	87	—	
V115	6AU6	1st Sound I-F. Amp.	2500 Mu. V. Signal	5	234	6	168	7	0.98	1	0	8.1	3.24	
			No Signal	5	231	6	165	7	0.95	1	0	7.9	3.30	
V116	6AU6	2d Sound I-F Amp.	2500 Mu. V. Signal	5	200	6	73	7	0	1	−0.45	3.73	1.37	
			No Signal	5	198	6	75	7	0	1	−0.53	3.64	1.28	
V117	6AL5	Sound Discrim.	2500 Mu. V. Signal	2	−0.6	—	—	5	0.1	—	—	—	—	
			No Signal	2	−1.52	—	—	5	1.5	—	—	—	—	
V118	6AV6	1st Audio Amplifier	2500 Mu. V. Signal	7	96	—	—	2	0	1	−0.87	0.54	—	
			No Signal	7	95	—	—	2	0	1	−0.86	0.52	—	
V119	6AQ5	Audio Output	2500 Mu. V. Signal	5	257	6	271	2	19.8	7	0	28.5	1.97	
			No Signal	5	251	6	268	2	19.2	7	0	28.2	1.92	
SR101		Rectifier	2500 Mu. V. Signal	—	0	—	—	—	141	—	—	226	—	
			No Signal	—	0	—	—	—	140	—	—	245	—	
SR102		Rectifier	2500 Mu. V. Signal	—	141	—	—	—	282	—	—	226	—	
			No Signal	—	140	—	—	—	280	—	—	245	—	

2T51, 2T60

R-F UNIT WIRING DIAGRAM

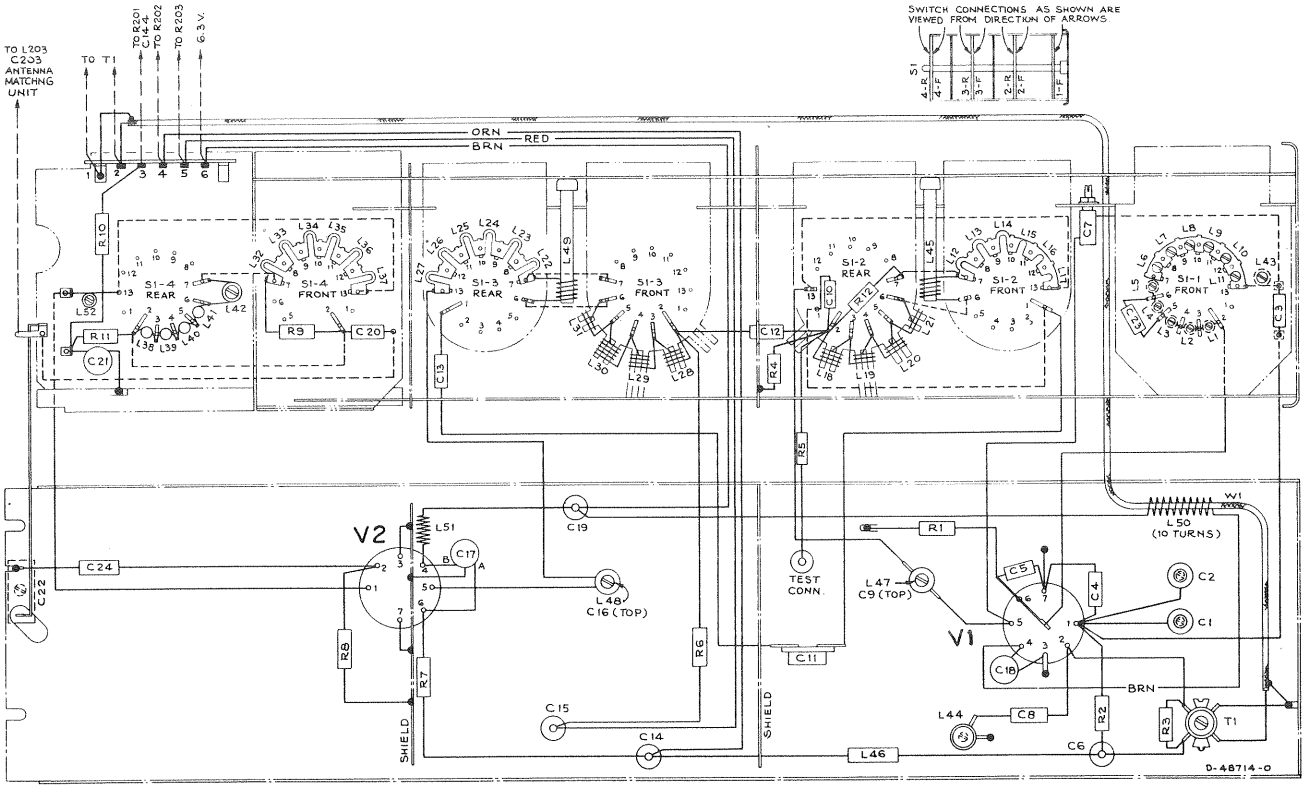


Figure 66—R-F Unit Wiring Diagram

CRITICAL LEAD DRESS:

1. All leads in the picture and sound i-f circuits must be dressed as short and direct as possible with the exception of C107, C11 and C117 which are to be dressed with enough slack so as not to have to move the body of the capacitor to align that particular stage.
2. Dress the yellow lead from pin 3 of V106 socket up in the air and away from V105 socket.
3. Dress all components connected to V106 socket up and away from the chassis except L103.
4. Keep the body and coded end of L103 as close to pin 2 of V105 socket as possible.
5. Keep the bus from pin 5 of V105 socket to L102 as short as possible and employ sleeving to prevent shorting.
6. Dress the red lead from kinescope socket away from V105 and V106 sockets and on power transformer side of terminal boards.
7. Dress the yellow lead from the kinescope socket along the rear apron between T107 and V111 socket, up between V107 socket and the power transformer to the terminal board.
8. The green lead from the kinescope socket should be dressed away from all other leads and components and away from V106.
9. Pin 7 of V116 socket should be soldered to the chassis as short as possible.
10. Dress fuse in high voltage compartment so as not to short circuit to ground.
11. Dress the two filament leads away from the T108 high voltage winding by pulling them up through hole so as to have all slack on the transformer side of the insulating board.
12. Keep V113 filament leads away from the metal side of the high voltage compartment shield.
13. Dress C158 on high voltage rectifier socket so as to keep the hot end of the capacitor away from the metal side of the high voltage compartment.
14. Keep all leads away from R177 for heat reasons.
15. Dress R210 and R211 away from all components on account of their heat.
16. Dress AC leads at S102 away from audio components on R194.
17. Clamp W105 in cable lance provided on rear apron.
18. Keep leads on C182 and C183 as short as possible.
19. Keep C133 dressed above leads.
20. Dress the body of C131 away from the chassis.
21. Keep C150 dressed away from the chassis.
22. Dress the orange lead from C160-C on the power transformer side of the terminal boards and around the rear apron side of V106 socket.
23. Dress the body of R119 as close to pin 5 on V104 socket as possible.
24. Dress the body of R124 as close to pin 2 on V105 socket as possible.
25. Keep the leads of C122 and C125 as short and direct as possible.
26. Keep the leads of C126 as short as possible.
27. Dress the leads of the AGC switch S105 next to the base in the chassis and away from sound components.
28. Solder terminal on can of C160 to bracket along with C134.

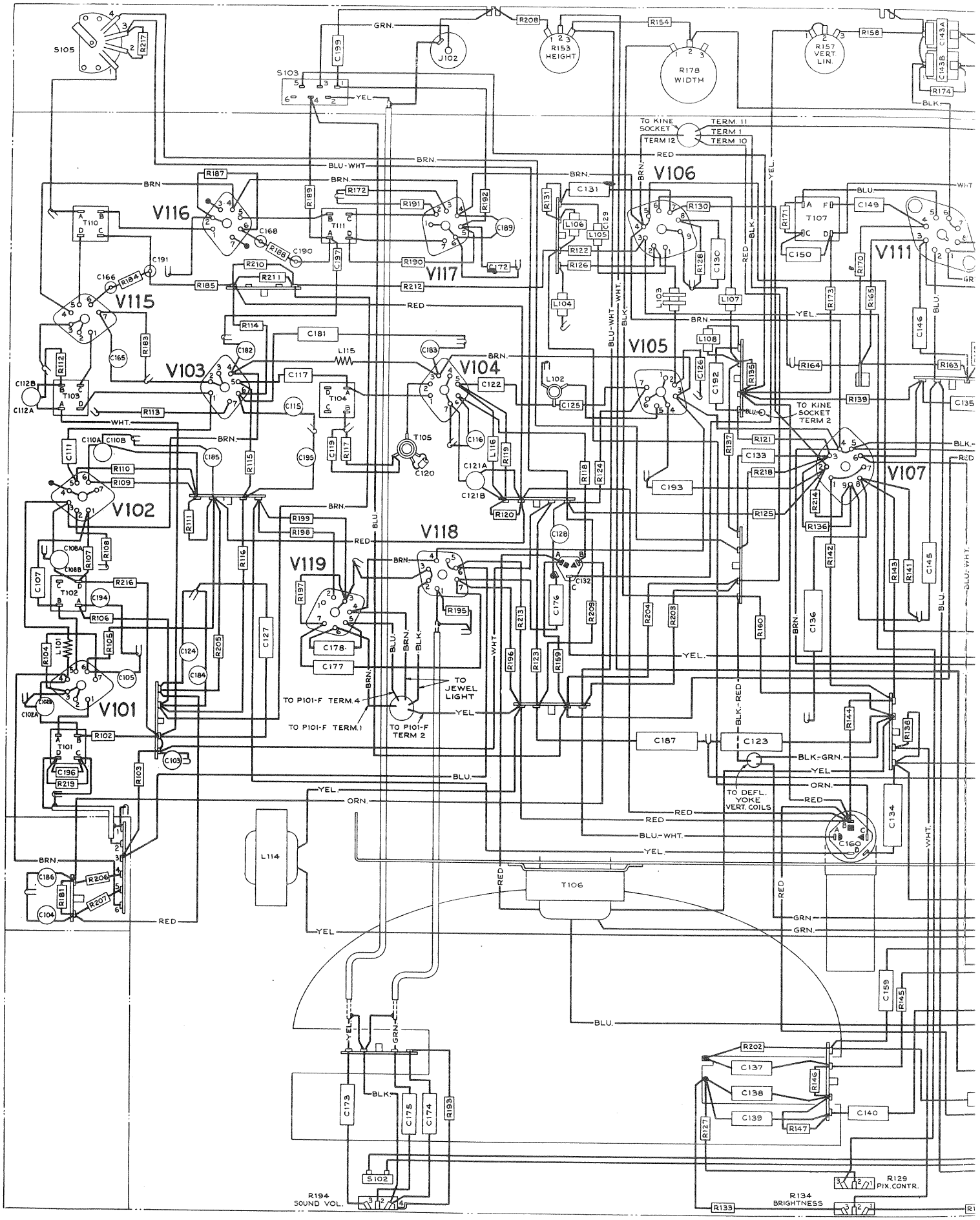
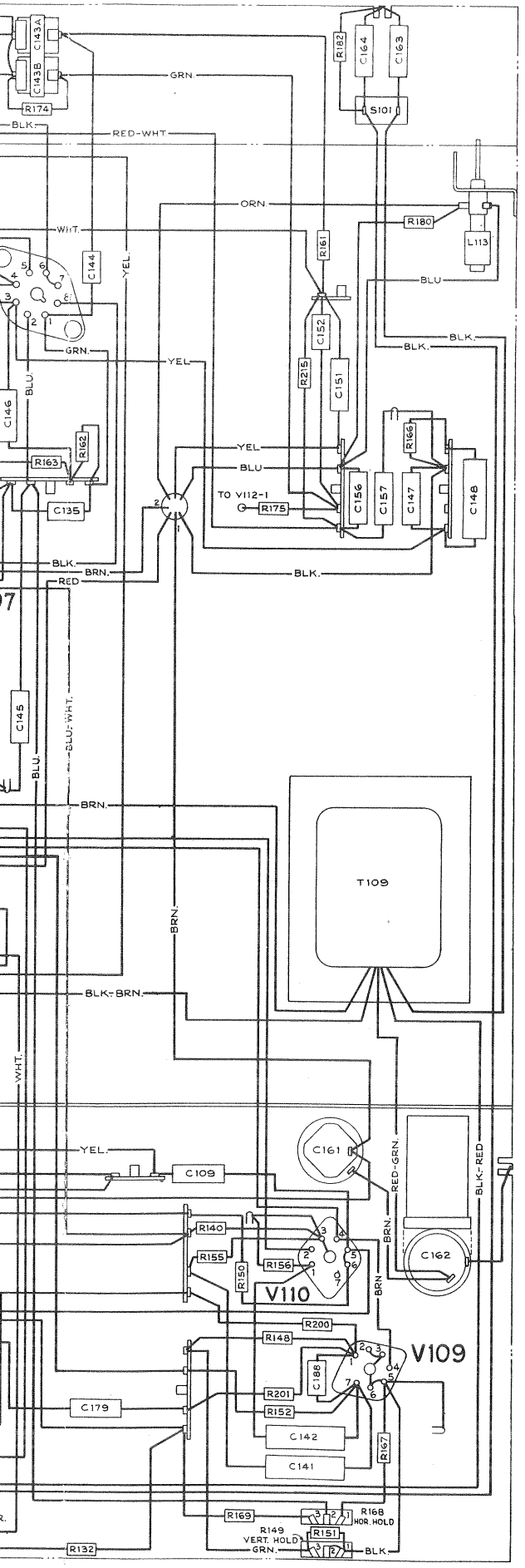
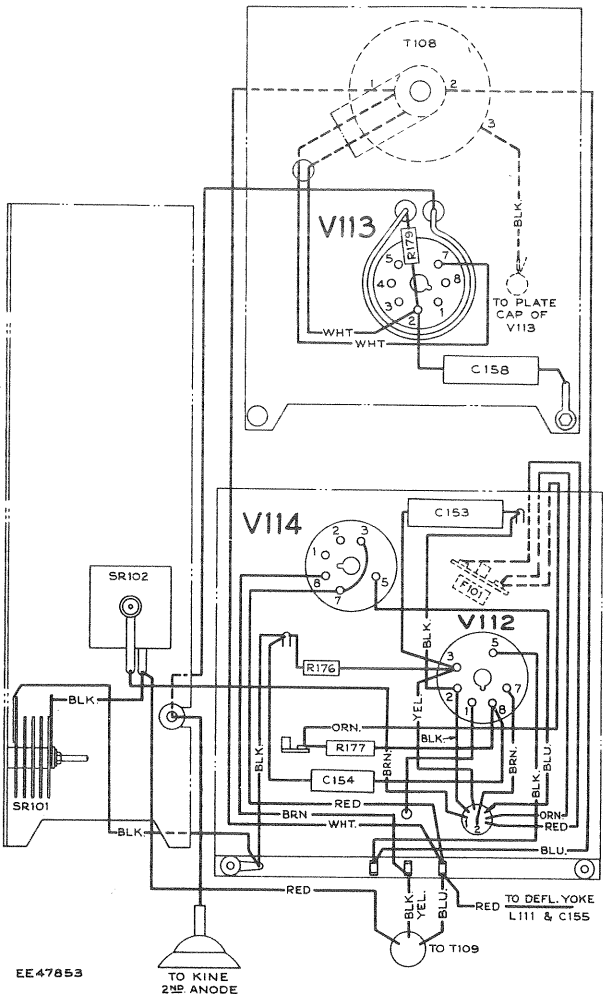
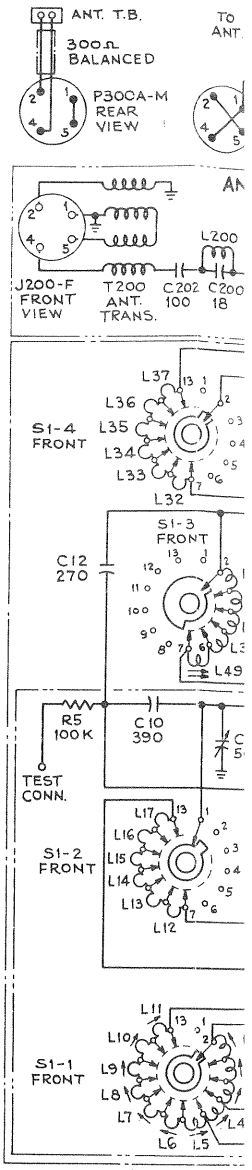


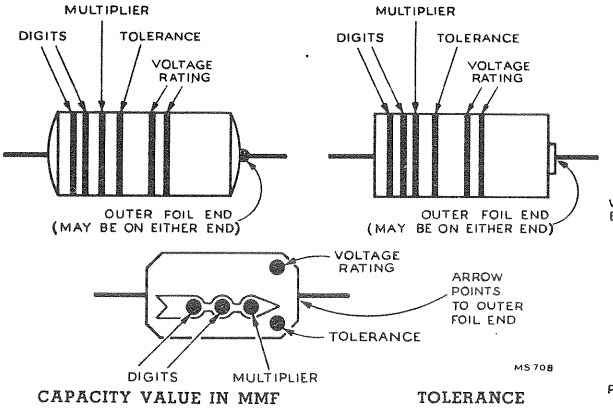
Figure 67—Chassis Wiring Di







COLOR CODES, MOULDED PAPER CAPACITORS



CAPACITY VALUE IN MMF

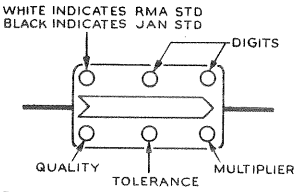
COLOR	DIGITS	MULTIPLIER
BLACK	0	1
BROWN	1	10
RED	2	100
ORANGE	3	1,000
YELLOW	4	10,000
GREEN	5	
BLUE	6	
VIOLET	7	
GRAY	8	
WHITE	9	

TOLERANCE

COLOR	TOLERANCE
BLACK BAND OR NONE	±20%
WHITE OR SILVER	±10%
YELLOW OR GOLD	±5%

The Voltage Rating is given in hundreds of volts. Only one band is employed for ratings under 1,000 volts. Two bands are employed for ratings over 1,000 volts. Use digit column to read voltage rating.

RMA COLOR CODE, FIXED MIC



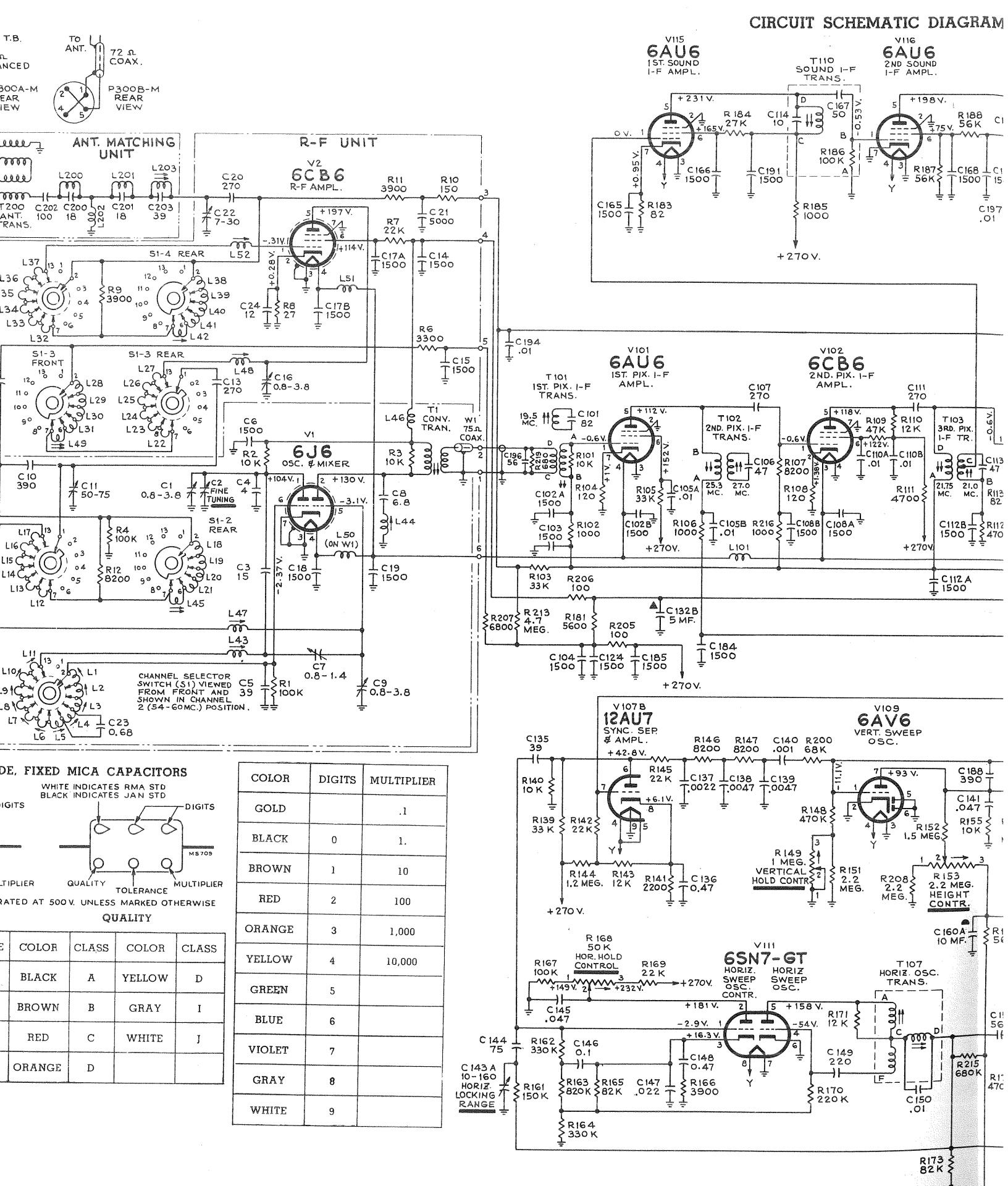
RMA FIXED MICA CAPACITORS RATED AT 500 V. U

TOLERANCE

COLOR	TOLERANCE	COLOR	CL
RED	±2%	BLACK	
GREEN	±5%	BROWN	
SILVER	±10%	RED	
BLACK	±20%	ORANGE	

All resistance values in ohms. K = 1,000.

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



DE, FIXED MICA CAPACITORS

RATED AT 500 V. UNLESS MARKED OTHERWISE

QUALITY

E	COLOR	CLASS	COLOR	CLASS
	BLACK	A	YELLOW	D
	BROWN	B	GRAY	I
	RED	C	WHITE	J
	ORANGE	D		

COLOR	DIGITS	MULTIPLIER
GOLD		.1
BLACK	0	1.
BROWN	1	10
RED	2	100
ORANGE	3	1,000
YELLOW	4	10,000
GREEN	5	
BLUE	6	
VIOLET	7	
GRAY	8	
WHITE	9	

s in ohms. K =

es less than 1 in MF unless other-

In some receivers, substitutions have caused changes in component lead color codes, in resistor and capacitor values.

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

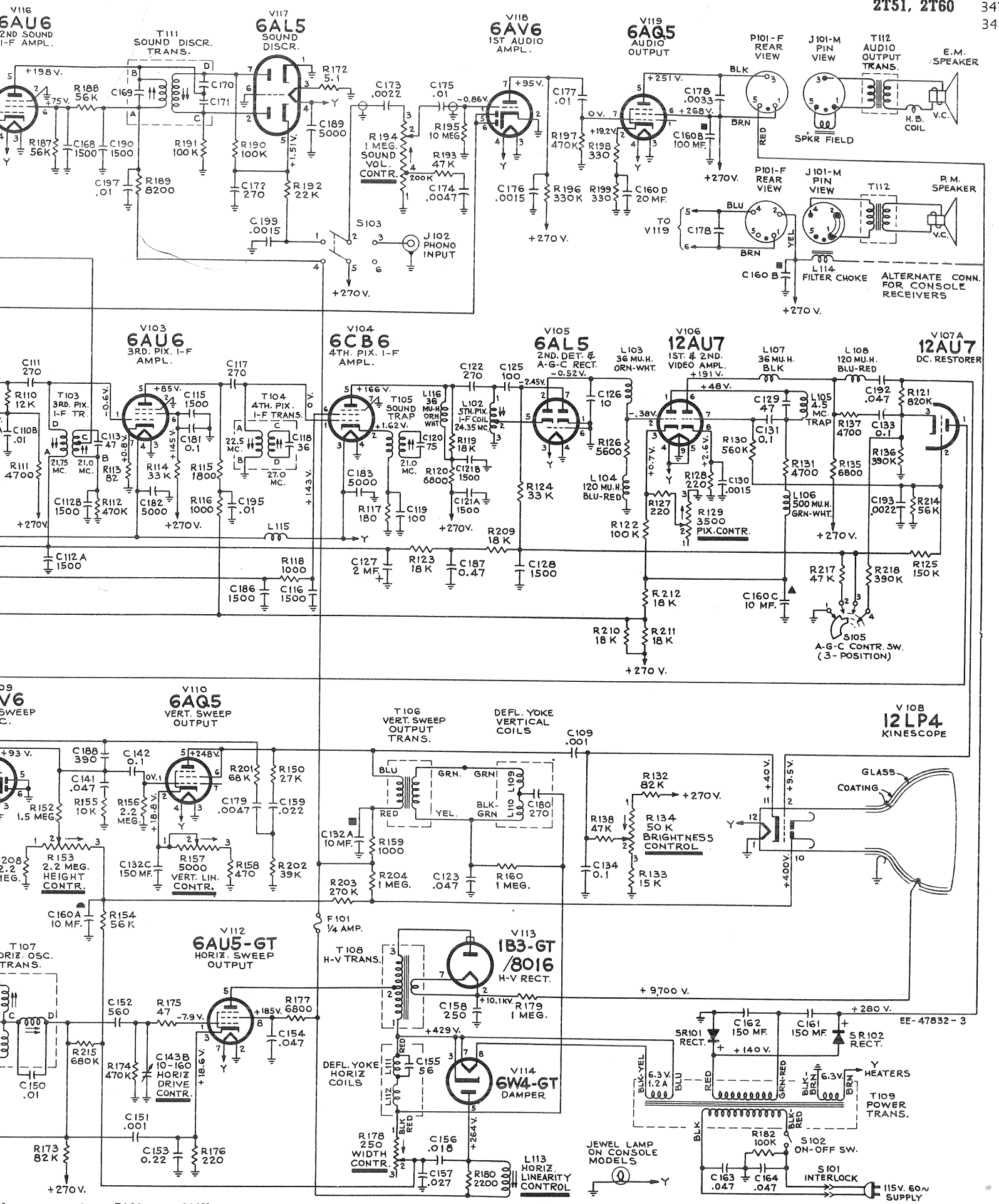
Coil resistance values less than 1 ohm are not shown.

Direction of arrows at controls indicates clockwise rotation.

In some receivers R

In some receivers C110A & B were 150 .033.

In some receivers F



In some receivers R130 was 390K. In some receivers C105A was 1500, C110A & B were 1500 and C156 was 33.

In some receivers R219 was omitted.

In some receivers R155 was 12K. R130 was connected between pin 7 of V106 and gnd.

In some receivers C197 and C199 were omitted.

In some receivers R115 was 3900, R119 was 8200, R120 was 1000 and L116 was omitted. T104 bottom was tuned to 24.35 mc. and L102 was tuned to 22.5 mc.

Figure 68—Circuit Schematic Diagram

STOCK No.	DESCRIPTION
75211	Transformer—Sound i-f transformer (T110, C114, C167, R186)
75212	Transformer—Sound discriminator transformer (T111, C169, C170, C171)
75213	Transformer—Horizontal oscillator transformer (T107)
75214	Transformer—Antenna matching transformer complete with antenna connector, i-f and FM traps and antenna shunt coil for KCS45A (T200, C200, C201, C202, C203, J200, L200, L201, L202, L203)
75509	Transformer—Antenna matching transformer complete with antenna connector, i-f and F-M traps and antenna shunt coil for KCS45 (T200, C200, C201, C202, C203, J200, L200, L201, L202, L203)
75240	Transformer—Hi-voltage transformer (T108)
71778	Trap—Sound trap (T105, C120)
75251	Trap—4.5 mc trap (L105, C129)
75242	Trap—I-F trap (L200, L201, C200, C201)
75449	Trap—FM trap complete with adjustable core and stud (L203, C203)
75451	Tubing—Insulated tubing for kinescope straps (30¾")
75204	Yoke—Deflection yoke (L109, L110, L111, L112, C155, C180)
	SPEAKER ASSEMBLIES
	970773-2
	RL 116-2
	(For Model 2T51)
74316	Connector—3 contact male connector for speaker (J101)
X3128	Cloth—Speaker grille cloth
75628	Speaker—5" x 7" EM speaker complete with cone and voice coil (3.2 ohms) less output transformer and plug
71419	Transformer—Output transformer (T112)
	SPEAKER ASSEMBLIES
	92580-4W
	RL 105C8
	(For Model 2T60)
75023	Cap—Dust cap
75024	Cone—Cone complete with voice coil (3.2 ohms)
5039	Connector—4 contact male connector (J101)
75022	Speaker—8" PM speaker complete with cone and voice coil less plug and transformer
75520	Transformer—Output transformer (T112)
	NOTE:—If stamping on speaker in instruments does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
75502	Back—Cabinet back complete with power cord and terminal board for Model 2T60
75472	Back—Cabinet back complete with power cord and terminal board for Model 2T51
75473	Board—"Ant" terminal board
71599	Bracket—Pilot lamp bracket (Model 2T60)
13103	Cap—Pilot lamp cap for Model 2T60
73643	Clip—Spring clip for channel marker escutcheon
X3123	Cloth—Grille cloth for mahogany or walnut instruments (Model 2T60)

STOCK No.	DESCRIPTION
39153	Connector—4 contact male connector for antenna interconnecting cable
75474	Connector—Single contact male connector for antenna interconnecting cable (2 req'd)
71457	Cord—Power cord and plug
74891	Cushion—Vinylite cushion (35") for masking panel
75470	Cushion—Rubber cushion for back of safety glass (2 req'd)
75471	Cushion—Rubber cushion for front of safety glass (Model 2T51)
75479	Decal—Control function decal for mahogany or walnut instruments (Model 2T60)
75480	Decal—Control function decal for oak instruments (Model 2T60)
75467	Decal—Control function decal (Model 2T51)
74809	Emblem—"RCA Victor" emblem
75499	Escutcheon—Channel marker escutcheon—dark—for mahogany or walnut instruments (Model 2T60) or plastic instruments (Model 2T51)
75501	Escutcheon—Channel marker escutcheon—light—for oak instruments (Model 2T60)
75478	Glass—Safety glass (Model 2T60)
75468	Glass—Safety glass (Model 2T51)
74959	Knob—Fine tuning control knob—maroon—for mahogany or walnut instruments (Model 2T60) or plastic instruments (Model 2T51) (outer)
75461	Knob—Fine tuning control knob—beige—for oak instruments (outer) (Model 2T60)
74960	Knob—Channel selector knob—maroon—for mahogany or walnut instruments (Model 2T60) or plastic instruments (Model 2T51) (inner)
75462	Knob—Channel selector knob—beige—for oak instruments (inner) (Model 2T60)
74962	Knob—Brightness control or vertical hold control knob—maroon—for mahogany instruments (Model 2T60) or plastic instruments (Model 2T51) (outer)
75463	Knob—Brightness control or vertical hold control knob—beige—for oak instruments (outer) (Model 2T60)
74969	Knob—Volume control and power switch knob—maroon—for mahogany or walnut instruments (Model 2T60) or plastic instruments (Model 2T51)
75503	Knob—Volume control and power switch knob—beige—for oak instruments (dual) (Model 2T60)
74963	Knob—Picture control or horizontal hold control knob—maroon—for mahogany or walnut instruments (Model 2T60) and plastic instruments (Model 2T51) (inner)
75464	Knob—Picture control or horizontal hold control knob—beige—for oak instruments (inner) (Model 2T60)
11765	Lamp—Pilot lamp—Mazda—for Model 2T60
75477	Mask—Kinescope masking panel (metal) (Model 2T60)
75469	Mask—Kinescope masking panel (metal) (Model 2T51)
33225	Nut—Speed nut to fasten antenna in cabinet or to fasten masking panel to cabinet (Model 2T51)
72845	Spring—Retaining spring for knobs 74959 and 75461
14270	Spring—Retaining spring for knobs 74960, 74962, 74969, 75462, 75463, and 75503
30330	Spring—Retaining spring for knobs 74963 and 75464
75500	Washer—Felt washer

To obtain resistors for which no stock number is given, order by stating type, value of resistance, tolerance and wattage.

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

STOCK No.	DESCRIPTION
16058	Grommet—Rubber grommet for 2nd. anode lead exit
75206	Hood—Deflection yoke hood complete with cushions
75205	Magnet—Focus magnet complete with adjustable plate and stud
74148	Magnet—Ion trap magnet (PM type)
75225	Pad—Rubber pad to mount kinescope (4 req'd)
75234	Pad—Rubber pad (3" long) for junction of kinescope straps
75147	Plate—Hi-voltage transformer mounting plate (bakelite) complete with tube socket less transformer
18469	Plate—Bakelite mounting plate for electrolytic #75220
75221	Rectifier—Selenium rectifier (SR101, SR102)
72067	Resistor—Wire wound, 5.1 ohms, ½ watt (R172)
	Resistor—Fixed, composition:—
	47 ohms, ±20%, ½ watt (R175)
	82 ohms, ±10%, ½ watt (R113, R183)
	100 ohms, ±20%, ½ watt (R205, R206)
	120 ohms, ±10%, ½ watt (R104, R108)
	180 ohms, ±10%, ½ watt (R117)
	220 ohms, ±10%, ½ watt (R127, R128)
	220 ohms, ±10%, 2 watts (R176)
	330 ohms, ±10%, 1 watt (R198, R199)
	470 ohms, ±20%, ½ watt (R158)
	680 ohms, ±10%, ½ watt (R219)
	1000 ohms, ±20%, ½ watt (R102, R106, R116, R118, R159, R185, R216)
	1800 ohms, ±10%, ½ watt (R115)
	2200 ohms, ±20%, ½ watt (R141)
	2200 ohms, ±20%, 1 watt (R180)
	3900 ohms, ±10%, ½ watt (R166)
	4700 ohms, ±5%, ½ watt (R131)
	4700 ohms, ±10%, ½ watt (R137)
	4700 ohms, ±10%, 1 watt (R111)
	5600 ohms, ±5%, ½ watt (R126)
	5600 ohms, ±10%, 2 watts (R181)
	6800 ohms, ±10%, 1 watt (R120)
	6800 ohms, ±10%, 2 watts (R135, R177)
	6800 ohms, ±20%, 2 watts (R207)
	8200 ohms, ±5%, ½ watt (R107)
	8200 ohms, ±10%, ½ watt (R146, R147, R189)
	10,000 ohms, ±10%, ½ watt (R140)
	10,000 ohms, ±5%, ½ watt (R155)
	12,000 ohms, ±5%, ½ watt (R171)
	12,000 ohms, ±10%, ½ watt (R143)
	12,000 ohms, ±5%, 1 watt (R110)
	15,000 ohms, ±10%, ½ watt (R133)
	18,000 ohms, ±10%, ½ watt (R119, R123, R209)
	18,000 ohms, ±10%, 1 watt (R212)
	18,000 ohms, ±10%, 2 watts (R210, R211)
	22,000 ohms, ±10%, ½ watt (R142, R145)
	22,000 ohms, ±20%, ½ watt (R192)
	22,000 ohms, ±10%, 1 watt (R169)
	27,000 ohms, ±10%, ½ watt (R184)
	27,000 ohms, ±10%, 1 watt (R150)
	33,000 ohms, ±10%, ½ watt (R103, R105)
	33,000 ohms, ±20%, ½ watt (R114, R124)
	33,000 ohms, ±10%, 2 watts (R139)
	39,000 ohms, ±10%, 1 watt (R202)
	47,000 ohms, ±10%, ½ watt (R138, R193, R217)
	47,000 ohms, ±20%, ½ watt (R109)
	56,000 ohms, ±10%, ½ watt (R154, R187, R188, R214)
	68,000 ohms, ±20%, ½ watt (R200, R201)
	82,000 ohms, ±10%, ½ watt (R132)
	82,000 ohms, ±10%, 1 watt (R165, R173)
	100,000 ohms, ±5%, ½ watt (R190, R191)
	100,000 ohms, ±10%, 1 watt (R122, R167)
	100,000 ohms, ±20%, 1 watt (R182)
	150,000 ohms, ±10%, ½ watt (R161)
	150,000 ohms, ±20%, ½ watt (R125)
	220,000 ohms, ±5%, 1 watt (R170)
	270,000 ohms, ±10%, ½ watt (R203)
	330,000 ohms, ±5%, ½ watt (R162)
	330,000 ohms, ±10%, ½ watt (R196)
	330,000 ohms, ±5%, 1 watt (R164)
	390,000 ohms, ±10%, ½ watt (R136, R218)
	470,000 ohms, ±10%, ½ watt (R112, R113, R148, R174, R183, R197)
	560,000 ohms, ±10%, ½ watt
	680,000 ohms, ±10%, ½ watt (R215)
	820,000 ohms, ±10%, ½ watt (R121, R163)
	1 megohm, ±10%, ½ watt (R204)
	1 megohm, ±20%, ½ watt (R160)
	1 megohm, ±20%, 1 watt (R179)
	1.2 megohm, ±10%, 1 watt (R144)
	1.5 megohm, ±10%, ½ watt (R152)
	2.2 megohm, ±10%, ½ watt (R156)
	2.2 megohm, ±20%, ½ watt (R151, R208)
	4.7 megohm, ±10%, ½ watt (R213)
	10 megohm, ±20%, ½ watt (R195)
74416	Screw—#10-32 x 1¾" hex head screw to fasten kinescope retaining straps
75083	Screw—#8-32 x ¼" wing screw to mount deflection yoke
74602	Screw—#10-32 x 1¾" cross recessed round head screw for focus magnet adjustment
75236	Screw—#8-32 x ⅜" cross recess binder head screw for focus magnet mounting (2 req'd)
73584	Shield—Tube shield for V104 and V116
75232	Shield—R-F unit shield
73521	Shield—Tube shield for V105, V117
75222	Socket—Tube socket, octal, ceramic, plate mounted
73117	Socket—Tube socket, 7 pin, miniature
75223	Socket—Tube socket, 9 pin, miniature
71508	Socket—Tube socket, 6 contact, moulded for 1B3/8016
60942	Socket—Tube socket, 6 contact, steatite for 6AU5GT & 6W4GT
74834	Socket—Kinescope socket
31364	Socket—Pilot lamp socket for KCS45A
75233	Spring—Compression spring for focus magnet adjustment
75239	Spring—Suspension spring for 2nd. anode lead
75226	Strap—Kinescope retaining strap (metal)—upper
75227	Strap—Kinescope retaining strap (metal)—lower
75231	Strap—Mounting strap for deflection yoke hood (2 req'd)
33491	Switch—"TV-phono" switch (S103)
75629	Switch—AGC switch (S105)
75207	Transformer—Power transformer 117 volts, 60 cycle (T109)
75208	Transformer—Vertical output transformer (T106)
74589	Transformer—First pix, i-f transformer (T101, C101, R101)
74590	Transformer—Second pix, i-f transformer (T102, C106)
75209	Transformer—Third pix, i-f transformer (T103, C113)
73574	Transformer—Fourth pix, i-f transformer (T104, C118)

STOCK No.	DESCRIPTION
75450	Capacitor—Ceramic, 39 mmf. (C203)
74726	Capacitor—Mica, 39 mmf. (C135)
71924	Capacitor—Ceramic, 56 mmf. (C196)
75247	Capacitor—Mica, 75 mmf. (C144)
75437	Capacitor—Ceramic, 100 mmf. (C202)
45469	Capacitor—Ceramic, 100 mmf. (C119)
39396	Capacitor—Ceramic, 100 mmf. (C125)
75248	Capacitor—Mica, 220 mmf. (C149)
75244	Capacitor—Ceramic, 270 mmf. (C172)
73091	Capacitor—Mica, 270 mmf. (C107, C111, C117, C122)
73094	Capacitor—Mica, 390 mmf. (C188)
74250	Capacitor—Mica, 560 mmf. (C152)
75166	Capacitor—Ceramic, 1500 mmf. (C166, C168, C190, C191)
75089	Capacitor—Ceramic, dual, 1500 mmf. (C102A, C102B, C108A, C108B, C112A, C112B, C121A, C121B)
73748	Capacitor—Ceramic, 1500 mmf. (C103, C104, C115, C116, C124, C128, C165, C184, C185, C186)
73473	Capacitor—Ceramic, 5000 mmf. (C182, C183, C189)
75877	Capacitor—Ceramic, dual, 10,000 mmf. (C105A, C105B, C110A, C110B)
73960	Capacitor—Ceramic, 10,000 mmf. (C194, C195, C197)
73747	Capacitor—Electrolytic, 2 mfd., 50 volts (C127)
75218	Capacitor—Electrolytic, comprising 1 section of 10 mfd., 350 volts, 1 section of 5 mfd., 350 volts, and 1 section of 150 mfd., 50 volts (C132A, C132B, C132C)
75219	Capacitor—Electrolytic, comprising 1 section of 10 mfd., 450 volts. 1 section of 100 mfd., 350 volts, 1 section of 10 mfd., 350 volts, and 1 section of 20 mfd., 25 volts (C160A, C160B, C160C, C160D)
75220	Capacitor—Electrolytic, 150 mfd., 200 volts (C161, C162)
75250	Capacitor—Tubular, moulded paper, mineral oil impregnated, .00025 mfd., 12,500 volts (C158)
73801	Capacitor—Tubular, paper, oil impregnated, .001 mfd., 600 volts (C140)
75249	Capacitor—Tubular, moulded paper, oil impregnated, .001 mfd., 600 volts (C151)
75344	Capacitor—Tubular, moulded paper, oil impregnated, .001 mfd., 1000 volts (C109)
73598	Capacitor—Tubular, paper, oil impregnated, .0015 mfd., 600 volts (C130, C176, C199)
73595	Capacitor—Tubular, paper, oil impregnated, .0022 mfd., 600 volts (C137, C173, C193)
73795	Capacitor—Tubular, paper, oil impregnated, .0033 mfd., 600 volts (C178)
73920	Capacitor—Tubular, paper, oil impregnated, .0047 mfd., 600 volts (C138, C139, C174, C179)
73561	Capacitor—Tubular, paper, oil impregnated, .01 mfd., 400 volts (C175, C177)
73594	Capacitor—Tubular, moulded paper, oil impregnated, .01 mfd., 600 volts (C150)
74727	Capacitor—Tubular, moulded paper, oil impregnated, .018 mfd., 1000 volts (C156)
73562	Capacitor—Tubular, paper, oil impregnated, .022 mfd., 400 volts (C147)
73798	Capacitor—Tubular, paper, oil impregnated, .022 mfd., 600 volts (C159)
75345	Capacitor—Tubular, moulded paper, oil impregnated, .027 mfd., 600 volts (C157)
73596	Capacitor—Tubular, moulded paper, oil impregnated, .033 mfd., 1000 volts (C156)
73553	Capacitor—Tubular, paper, oil impregnated, .047 mfd., 400 volts (C145, C192)
75071	Capacitor—Tubular, moulded paper, .047 mfd., 600 volts (C163, C164)
73592	Capacitor—Tubular, paper, oil impregnated, .047 mfd., 600 volts (C141)
73597	Capacitor—Tubular, paper, oil impregnated, .047 mfd., 1000 volts (C123, C154)
73551	Capacitor—Tubular, paper, oil impregnated, 0.1 mfd., 400 volts (C131, C133, C134, C146, C181)
73557	Capacitor—Tubular, paper, oil impregnated, 0.1 mfd., 600 volts (C142)
73560	Capacitor—Tubular, paper, oil impregnated, 0.22 mfd., 200 volts (C153)
73787	Capacitor—Tubular, paper, oil impregnated, 0.47 mfd., 200 volts (C136, C148, C187)
73154	Choke—Filter for KCS45 (L114)
75224	Clip—Mounting clip for electrolytic #75220
75167	Clip—Tubular clip for mounting stand-off capacitor #75166
75210	Coil—Fifth pix, i-f coil complete with adjustable core (L102)
71449	Coil—Horizontal linearity coil (L113)
73591	Coil—Antenna matching coil (2 req'd) (Part of T200)
75241	Coil—Antenna shunt coil (L202)
73477	Coil—Filament choke coil (L101, L115)
71793	Coil—Peaking coil (36 muh) (L107)
75299	Coil—Peaking coil (36 muh) (L103)
76011	Coil—Peaking coil—(36 muh) (L116)
75253	Coil—Peaking coil (120 muh) (L104, L108)
75252	Coil—Peaking coil (500 muh) (L106)
35787	Connector—Single contact phono input connector (J102)
74594	Connector—2 contact male connector for power cable
38853	Connector—4 contact female connector for antenna transformer (J200)
5040	Connector—4 contact female connector for speaker cable for KCS45A (P101)
71789	Connector—Anode connector
5119	Connector—3 contact female connector for speaker cable for KCS45 (P101)
75215	Control—Horizontal and vertical hold control (R149, R168)
75216	Control—Picture and brightness control (R129, R134)
71441	Control—Vertical linearity control (R157)
71440	Control—Height control (R153)
74945	Control—Width control (R178)
75237	Control—Volume control and power switch (R194, S102)
71498	Core—Adjustable core and stud for F.M. trap #75449 (part of Transformer #75214)
72772	Cover—Insulating cover for electrolytic #75220
73590	Cushion—Rubber cushion for deflection yoke hood (2 req'd)
74839	Fastener—Push fastener to mount ceramic tube socket (2 req'd)
73600	Fuse—0.25 amp; 250 volts (F101)
37396	Grommet—Rubber grommet for mounting ceramic tube socket (2 req'd)

STOCK No.	DESCRIPTION
75176	Screw—#4-40 x 3/8" fillister head screw for adjusting L5
75177	Screw—#4-40 x 5/16" fillister head screw for adjusting L1, L2, L3, L4, L43
74575	Screw—#4-40 x .359" adjusting screw for L42
73640	Screw—#4-40 x 7/16" adjusting screw for L52
75159	Shaft—Channel selector shaft and plate
75160	Shaft—Fine tuning shaft and cam
75168	Shield—Oscillator and convertor sections shield for r-f unit—snap-on type
75193	Shield—Tube shield for V1
75192	Shield—Tube shield for V2
75088	Socket—Tube socket, 7 contact, miniature, ceramic, saddle mounted
75191	Spacer—Insulating spacer for front plate (4 req'd)
75163	Spring—Friction spring (formed) for fine tuning cam
75068	Spring—Retaining spring for oscillator tube shield
74578	Spring—Retaining spring for adjusting screws
73457	Spring—Return spring for tuning control
30340	Spring—Hair pin spring for fine tuning link
75175	Stator—Oscillator section stator complete with rotor, segment, coils, adjusting screws and capacitors C3, and C23 (S1-1, C3, C23, L1, L2, L3, L4, L5, L6, L7, L8, L9, L10, L11, L43)
75178	Stator—Convertor stator complete with rotor, coils, capacitors (C10 and C12) and resistors, (R4 and R5) (S1-2, C10, C12, L12, L13, L14, L15, L16, L17, L18, L19, L20, L21, L45, R4, R5, R12)
75179	Stator—R-F amplifier stator complete with rotor, coils, capacitor (C13) and resistor (R6) (S1-3, C13, L22, L23, L24, L25, L26, L27, L28, L29, L30, L31, L49, R6)
75180	Stator—Antenna stator complete with rotor, coils, capacitors (C20 and C21) and resistors (R9, R10, R11) (S-4, C20, C21, L32, L33, L34, L35, L36, L37, L38, L39, L40, L41, L42, L52, R9, R10, R11)
75169	Strip—Coil segment mounting strip—RH center
75170	Strip—Coil segment mounting strip—LH lower
75171	Strip—Coil segment mounting strip—LH upper—less trimmer C7
75173	Stud—#6-32 x 13/16" adjusting stud for C7 trimmer
75446	Stud—Capacitor stud—brass—#4-40 x 13/16" with 3/64" screw driver slot for trimmer coils L47, L48 and capacitor C1 uncoded and coded "ER"
75447	Stud—Capacitor stud—brass—#4-40 x 13/16" with 3/64" screw driver slot for trimmer coils L47, L48 and capacitor C1 coded numerically and "Hi Q"
75181	Transformer—Convertor transformer
75190	Washer—Insulating washer (neoprene) for capacitor C7
73466	Washer—Insulating washer (round)
	CHASSIS ASSEMBLIES
	KCS 45—Model 2T51
	KCS45A—Model 2T60
75235	Board—Hi-voltage shield terminal board (3 contact)
75228	Bracket—Focus magnet mounting bracket—upper
75229	Bracket—Focus magnet mounting bracket—lower
75230	Bracket—Kinescope mounting bracket—on front apron of chassis
75217	Capacitor—Mica trimmer, dual, 10-160 mmf. (C143A, C143B)
53511	Capacitor—Ceramic, 10 mmf. (C126)

STOCK No.	DESCRIPTION
75450	Capacitor—Ceramic, 39 mmf. (C203)
74726	Capacitor—Mica, 39 mmf. (C135)
71924	Capacitor—Ceramic, 56 mmf. (C196)
75247	Capacitor—Mica, 75 mmf. (C144)
75437	Capacitor—Ceramic, 100 mmf. (C202)
45469	Capacitor—Ceramic, 100 mmf. (C119)
39396	Capacitor—Ceramic, 100 mmf. (C125)
75248	Capacitor—Mica, 220 mmf. (C149)
75244	Capacitor—Ceramic, 270 mmf. (C172)
73091	Capacitor—Mica, 270 mmf. (C107, C111, C117, C122)
73094	Capacitor—Mica, 390 mmf. (C188)
74250	Capacitor—Mica, 560 mmf. (C152)
75166	Capacitor—Ceramic, 1500 mmf. (C166, C168, C190, C191)
75089	Capacitor—Ceramic, dual, 1500 mmf. (C102A, C102B, C108A, C108B, C112A, C112B, C121A, C121B)
73748	Capacitor—Ceramic, 1500 mmf. (C103, C104, C115, C116, C124, C128, C165, C184, C185, C186)
73473	Capacitor—Ceramic, 5000 mmf. (C182, C183, C189)
75877	Capacitor—Ceramic, dual, 10,000 mmf. (C105A, C105B, C110A, C110B)
73960	Capacitor—Ceramic, 10,000 mmf. (C194, C195, C197)
73747	Capacitor—Electrolytic, 2 mfd., 50 volts (C127)
75218	Capacitor—Electrolytic, comprising 1 section of 10 mfd., 350 volts, 1 section of 5 mfd., 350 volts, and 1 section of 150 mfd., 50 volts (C132A, C132B, C132C)
75219	Capacitor—Electrolytic, comprising 1 section of 10 mfd., 450 volts. 1 section of 100 mfd., 350 volts, 1 section of 10 mfd., 350 volts, and 1 section of 20 mfd., 25 volts (C160A, C160B, C160C, C160D)
75220	Capacitor—Electrolytic, 150 mfd., 200 volts (C161, C162)
75250	Capacitor—Tubular, moulded paper, mineral oil impregnated, .00025 mfd., 12,500 volts (C158)
73801	Capacitor—Tubular, paper, oil impregnated, .001 mfd., 600 volts (C140)
75249	Capacitor—Tubular, moulded paper, oil impregnated, .001 mfd., 600 volts (C151)
75344	Capacitor—Tubular, moulded paper, oil impregnated, .001 mfd., 1000 volts (C109)
73598	Capacitor—Tubular, paper, oil impregnated, .0015 mfd., 600 volts (C130, C176, C199)
73595	Capacitor—Tubular, paper, oil impregnated, .0022 mfd., 600 volts (C137, C173, C193)
73795	Capacitor—Tubular, paper, oil impregnated, .0033 mfd., 600 volts (C178)
73920	Capacitor—Tubular, paper, oil impregnated, .0047 mfd., 600 volts (C138, C139, C174, C179)
73561	Capacitor—Tubular, paper, oil impregnated, .01 mfd., 400 volts (C175, C177)
73594	Capacitor—Tubular, moulded paper, oil impregnated, .01 mfd., 600 volts (C150)
74727	Capacitor—Tubular, moulded paper, oil impregnated, .018 mfd., 1000 volts (C156)
73562	Capacitor—Tubular, paper, oil impregnated, .022 mfd., 400 volts (C147)
73798	Capacitor—Tubular, paper, oil impregnated, .022 mfd., 600 volts (C159)
75345	Capacitor—Tubular, moulded paper, oil impregnated, .027 mfd., 600 volts (C157)

REPLACEMENT PARTS

STOCK No.	DESCRIPTION
	R-F UNIT ASSEMBLIES
	KRK8
10705	Ball—Steel ball for detent (5/32 dia.)
75188	Board—Terminal board, 5 contact and ground
75067	Bracket—Vertical bracket for holding oscillator tube shield
75201	Cable—75 ohms, coax cable (7¼") complete with coil (W1, L50)
75186	Capacitor—Ceramic, variable, for fine tuning—plunger type (C2)
75289	Capacitor—Ceramic, 4 mmf., ±0.5 mmf. (C4)
75189	Capacitor—Adjustable, 7-30 mmf. (C22)
75200	Capacitor—Ceramic, 12 mmf. (C24)
45465	Capacitor—Ceramic, 15 mmf. (C3)
75196	Capacitor—Ceramic, 39 mmf. (C5)
75174	Capacitor—Ceramic, trimmer, 50-75 mmf. (C11)
75199	Capacitor—Ceramic, 270 mmf. (C12, C13, C20)
75641	Capacitor—Ceramic, 390 mmf. (C10)
75166	Capacitor—Ceramic, 1500 mmf. (C6, C14, 15, C19)
75089	Capacitor—Ceramic, dual, 1500 mmf. (C17A, C17B)
73748	Capacitor—Ceramic, 1500 mmf. (C18)
73473	Capacitor—Ceramic, 5000 mmf. (C21)
75172	Capacitor—Tubular, steatite, adjustable, 0.8-1.4 mmf. (C7)
71504	Capacitor—Ceramic, 0.68 mmf. (C23)
75184	Capacitor—Ceramic, adjustable, 0.75-4 mmf., complete with adjusting stud (C1)
75197	Capacitor—Ceramic, 6.8 mmf. (C8)
75167	Clip—Tubular clip for mounting stand-off capacitors
75182	Coil—Trimmer coil (1½ turns) with adjustable inductance core and capacitor stud (screw adjustment) for convertor section (C9, L47)
75183	Coil—Trimmer coil (3 turns) with adjustable inductance core and capacitor stud (screw adjustment) for r-f section (L48, C16)
75185	Coil—Convertor plate loading coil (L44)
75202	Coil—Choke coil .56 muh (L46)
73477	Coil—Choke coil (L51)
75187	Core—Adjustable core for fine tuning capacitor C2
75162	Detent—Detent mechanism and fibre shaft
73453	Form—Coil form for L45 and L49
75165	Link—Link assembly for fine tuning
14343	Retainer—Fine tuning shaft retaining ring
	Resistor—Fixed, composition:—
	27 ohms, ±10%, ½ watt (R8)
	150 ohms, ±20%, ½ watt (R10)
	3300 ohms, ±10%, ½ watt (R6)
	3900 ohms, ±10%, ½ watt (R9, R11)
	8200 ohms, ±10%, ½ watt (R12)
	10,000 ohms, ±5%, ½ watt (R3)
	10,000 ohms, ±20%, ½ watt (R2)
	22,000 ohms, ±10%, ½ watt (R7)
	100,000 ohms, ±20%, ½ watt (R1, R4, R5)
75164	Rod—Actuating plunger rod (fibre) for fine tuning link
71476	Screw—#4-40 x ¼" binder head machine screw for adjusting L6, L7, L8, L9, L10, L11
75176	Screw—#4-40 x 3/8" fillister head screw for adjusting L5
75177	Screw—#4-40 x 5/16" fillister head screw for adjusting L1, L2, L3, L4, L43
74575	Screw—#4-40 x .359" adjusting screw for L42
73640	Screw—#4-40 x 7/16" adjusting screw for L52
75159	Shaft—Channel selector shaft and plate
75160	Shaft—Fine tuning shaft and cam
75168	Shield—Oscillator and convertor sections shield for r-f unit—snap-on type
75193	Shield—Tube shield for V1
75192	Shield—Tube shield for V2
75088	Socket—Tube socket, 7 contact, miniature, ceramic, saddle mounted
75191	Spacer—Insulating spacer for front plate (4 req'd)
75163	Spring—Friction spring (formed) for fine tuning cam
75068	Spring—Retaining spring for oscillator tube shield
74578	Spring—Retaining spring for adjusting screws
73457	Spring—Return spring for tuning control
30340	Spring—Hair pin spring for fine tuning link
75175	Stator—Oscillator section stator complete with rotor, segment, coils, adjusting screws and capacitors C3, and C23 (S1-1, C3, C23, L1, L2, L3, L4, L5, L6, L7, L8, L9, L10, L11, L43)
75178	Stator—Convertor stator complete with rotor, coils, capacitors (C10 and C12) and resistors, (R4 and R5) (S1-2, C10, C12, L12, L13, L14, L15, L16, L17, L18, L19, L20, L21, L45, R4, R5, R12)
75179	Stator—R-F amplifier stator complete with rotor, coils, capacitor (C13) and resistor (R6) (S1-3, C13, L22, L23, L24, L25, L26, L27, L28, L29, L30, L31, L49, R6)
75180	Stator—Antenna stator complete with rotor, coils, capacitors (C20 and C21) and resistors (R9, R10, R11) (S-4, C20, C21, L32, L33, L34, L35, L36, L37, L38, L39, L40, L41, L42, L52, R9, R10, R11)
75169	Strip—Coil segment mounting strip—RH center
75170	Strip—Coil segment mounting strip—LH lower
75171	Strip—Coil segment mounting strip—LH upper—less trimmer C7
75173	Stud—#6-32 x 13/16" adjusting stud for C7 trimmer
75446	Stud—Capacitor stud—brass—#4-40 x 13/16" with 3/64" screw driver slot for trimmer coils L47, L48 and capacitor C1 uncoded and coded "ER"
75447	Stud—Capacitor stud—brass—#4-40 x 13/16" with 3/64" screw driver slot for trimmer coils L47, L48 and capacitor C1 coded numerically and "Hi Q"
75181	Transformer—Convertor transformer
75190	Washer—Insulating washer (neoprene) for capacitor C7
73466	Washer—Insulating washer (round)
	CHASSIS ASSEMBLIES
	KCS 45—Model 2T51
	KCS45A—Model 2T60
75235	Board—Hi-voltage shield terminal board (3 contact)
75228	Bracket—Focus magnet mounting bracket—upper
75229	Bracket—Focus magnet mounting bracket—lower
75230	Bracket—Kinescope mounting bracket—on front apron of chassis
75217	Capacitor—Mica trimmer, dual, 10-160 mmf. (C143A, C143B)
53511	Capacitor—Ceramic, 10 mmf. (C126)