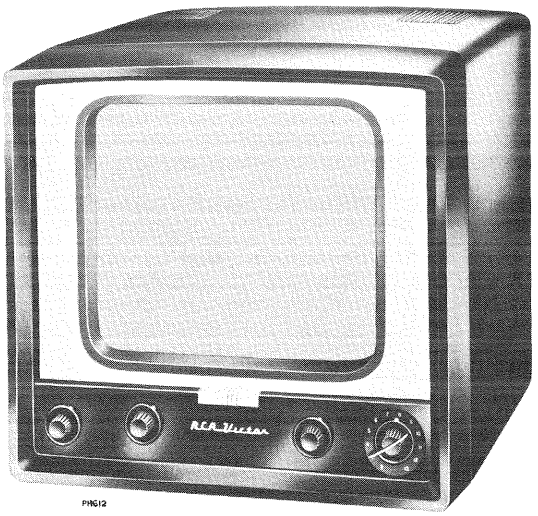


Model 4T101
"Bently"
Mahogany
Finish

RCA VICTOR

TELEVISION RECEIVER MODEL 4T101

Chassis No. 61

— Mfr. No. 274 —

SERVICE DATA

— 1951 No. T1 —

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

GENERAL DESCRIPTION

Model 4T101 receivers employ nineteen tubes plus rectifier and a 14EP4 kinescope.

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 .....96 square inches on a 14EP4 Kinescope

R-F FREQUENCY RANGES

Channel Number	Channel Freq. Mc.	Picture Carrier Freq. Mc.	Sound Carrier Freq. Mc.	Receiver R-F Osc. Freq. Mc.
2	54-60	55.25	59.75	80.750
3	60-66	61.25	65.75	86.750
4	66-72	67.25	71.75	92.750
5	76-82	77.25	81.75	102.750
6	82-88	83.25	87.75	108.750
7	174-180	175.25	179.75	200.750
8	180-186	181.25	185.75	206.750
9	186-192	187.25	191.75	212.750
10	192-198	193.25	197.75	218.750
11	198-204	199.25	203.75	224.750
12	204-210	205.25	209.75	230.750
13	210-216	211.25	215.75	236.750

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.

LOUDSPEAKER (92585-2W) .....5" x 7" PM Dynamic, 3.2 ohms

DIMENSIONS (inches)	Width	Height	Depth
Cabinet (outside)	18⅛	16⅛	23⅝

WEIGHT Model	Chassis with Tubes in Cabinet	Shipping Weight
4T101	73 lbs.	85 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 6SN7GT	Sync. Amp. and Vertical Sweep Osc.
(16)	RCA 6AQ5	Vertical Sweep Output
(17)	RCA 6SN7GT	Horizontal Sweep Osc. and Control
(18)	RCA 6AU5GT	Horizontal Sweep Output
(19)	RCA 6W4GT	Damper
(20)	RCA 1B3-GT/8016	High Voltage Rectifier
(21)	RCA 14EP4	Kinescope

First Edition—First Printing
6-29-51

Printed in U. S. A.

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

OPERATING CONTROLS (front Panel)

Channel Selector, Fine Tuning	Dual Control Knobs
Picture, Brightness	Dual Control Knobs
Picture Horizontal Hold, Picture Vertical Hold	Dual Control Knobs
Sound Volume and On-Off Switch	Single Control Knob

NON-OPERATING CONTROLS (not including r-f & i-f adjustments)

Picture Centering	top chassis adjustment
Width	rear chassis adjustment
Height	rear chassis adjustment
Horizontal Linearity	rear chassis screwdriver adjustment
Vertical Linearity	rear chassis adjustment
Horizontal Drive	rear chassis screwdriver adjustment
Horizontal Osc. Freq.	top chassis adjustment
Horizontal Osc. Waveform	bottom chassis adjustment
Horizontal Locking Range	rear chassis adjustment
Focus	top chassis adjustment
Ion Trap Magnet	top chassis adjustment
Deflection Coil	top chassis wing nut adjustment
AGC Control Switch	rear chassis adjustment

HIGH VOLTAGE WARNING

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

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.

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

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

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

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.

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.

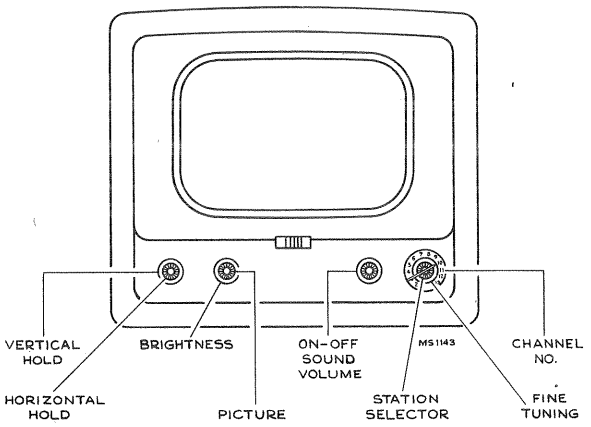


Figure 1—Receiver Operating Controls

INSTALLATION INSTRUCTIONS

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

Take the receiver out of the carton and remove all packing material.

Install the control knobs on the proper control shafts.

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.

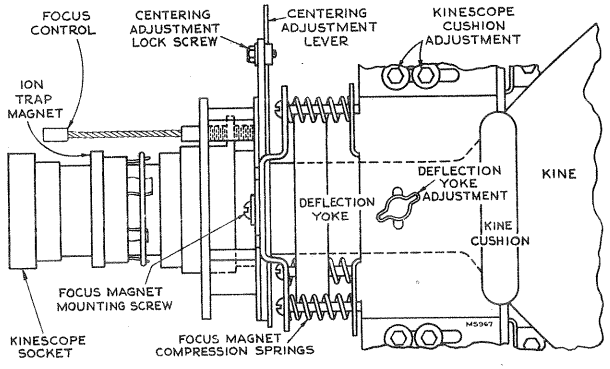


Figure 2—Yoke and Focus Magnet Adjustments

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.

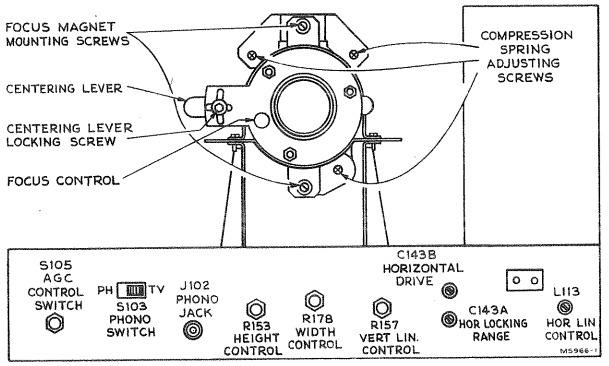


Figure 3—Rear Chassis Adjustments

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 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 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. 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 picture 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 11. 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.

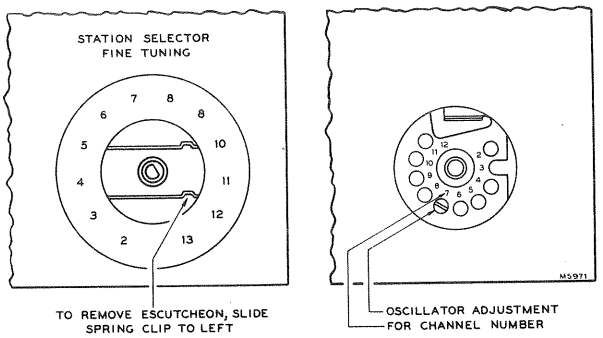


Figure 4—R-F Oscillator Adjustments

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 10. 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.

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.

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

The location should be chosen—

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

—To give easy access for operation and comfortable viewing.

—To permit convenient connection to the antenna.

—Convenient to an electrical outlet.

—To allow adequate ventilation

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 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.

RCA Television Antenna, type No. 225A1 is designed for reception of all twelve television channels. The antenna uses the 300-ohm RCA "Bright Picture" television transmission line. The antenna, a dipole with reflector, is unidirectional on channels two through six. When used on these channels, the maximum signal is obtained when the antenna rods are broadside toward the transmitting antenna, with the antenna element between the reflector and the transmitting antenna.

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.

When operated on channels seven through thirteen (174 to 216 Mc), the antenna has side lobes. On these channels, the maximum signal will be obtained when the antenna is rotated approximately 35 degrees in either direction from its broadside position toward the transmitting antenna. In many instances this effect may not cause any difficulties and it may be possible to make a compromise orientation which will permit satisfactory reception on all high and low channels. In some instances, however, this will not be the case due to reflections or to insufficient signal strength from one or more stations.

RCA antenna type 204A1 is available for use in locations in which it is desirable to eliminate side lobes and to have the antennas 7-13 directivity the same as 2-6 directivity.

For use in cases where it is desirable to have adjustable 7-13 directivity different from 2-6, RCA antenna type 206A1 is provided.

If it is impossible to obtain satisfactory results on one or more channels, it may become necessary either to provide means for tuning the antenna when switching channels or to install a separate antenna for one or more channels and to switch antennas when switching channels.

In weak signal areas it is possible to "stack" the type 204A1 antenna to obtain increased signal strength by employing one type 204A1 antenna and one type 208A1 stacking kit.

REFLECTIONS.—Multiple images sometimes known as echoes or ghosts, are caused by the signal arriving at the antenna by two or more routes. The second or subsequent image occurs when a signal arrives at the antenna after being reflected off a building, a hill or other object. In severe cases of reflections, even the sound may be distorted. In less severe cases, reflections may occur that are not noticeable as reflections but that will instead cause a loss of definition in the picture.

Depending upon the circumstances, it may be possible to eliminate the reflections by rotating the antenna or by moving it to a new location. In extreme cases, it may be impossible to eliminate the reflection.

INTERFERENCE.—Auto ignition, street cars, electrical machinery and diathermy apparatus may cause interference which spoils the picture. Whenever possible, the antenna location should be removed as far as possible from highways, hospitals, doctors' offices and similar sources of interference. In mounting the antenna, care must be taken to keep the antenna rods at least ¼ wave length (at least 6 feet) away from other antennas, metal roofs, gutters or other metal objects.

Short-wave radio transmitting and receiving equipment may cause interference in the picture in the form of moving ripples. In some instances it may be possible to eliminate the interference by the use of a trap in the antenna transmission line. However, if the interfering signal is on the same frequency as the television station, a trap will provide no improvement.

WEAK PICTURE.—When the installation is near the limit of the area served by the transmitting station, the picture may be speckled, having a "snow" effect, and may not hold steady on the screen. This condition is due to lack of signal strength from the transmitter.

CHASSIS TOP VIEW

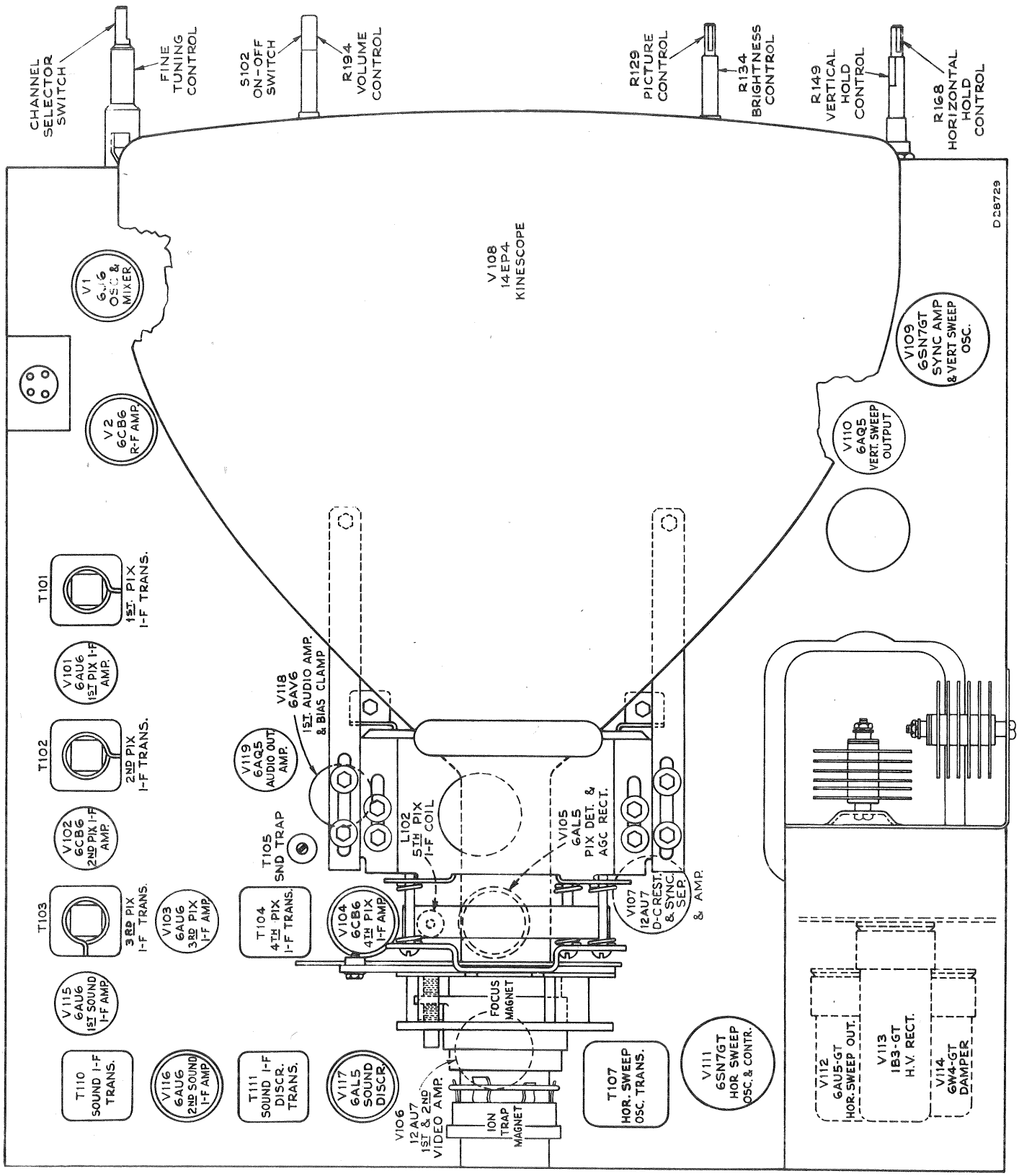


Figure 5—Chassis Top View

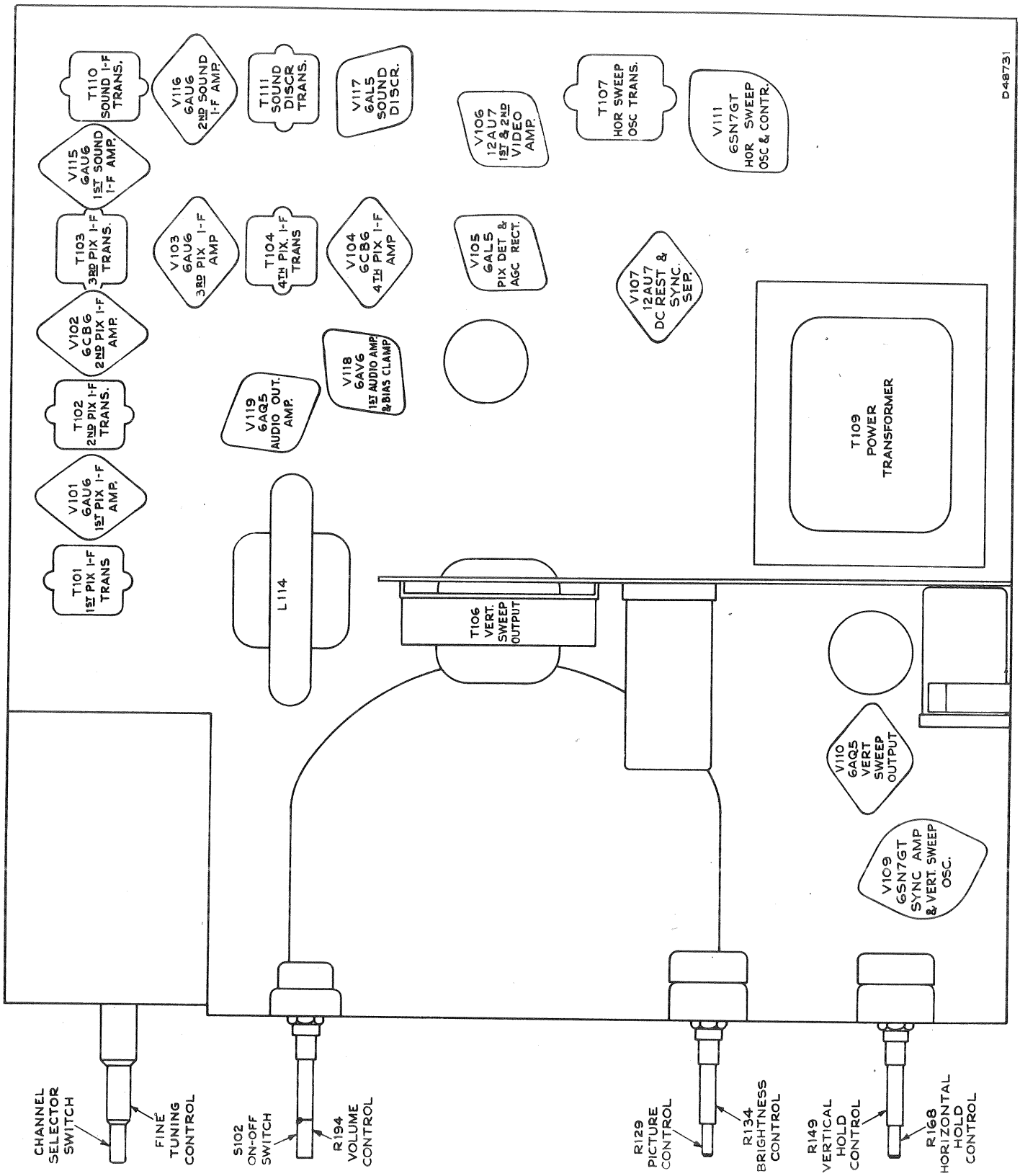


Figure 6—Chassis Bottom View

ALIGNMENT PROCEDURE

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-57A, WO-58A, WO-79A, WO-79B 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, WO-79A and WO-79B 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.

Connect the oscilloscope to the second sound i-f grid return (terminal A of T110) in series with a 33,000 ohm isolating resistor.

Adjust T110, top and bottom, 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 13.

The output level from the sweep should be set to produce approximately 0.3 volt peak-to-peak at the second sound i-f grid, 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 200 kc.

PICTURE I-F TRAP ADJUSTMENT.—Connect the "Volt-Ohmyst" 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 "Volt-Ohmyst." 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)

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.

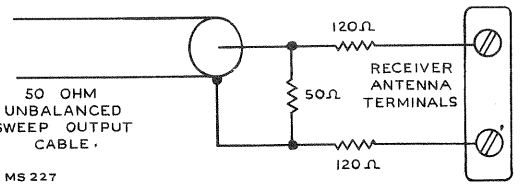


Figure 7—Unbalanced Sweep Cable Termination

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 16.

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 16.

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 the 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 16 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 suck-outs 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 response curve shapes 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 Freq. Mc. Carrier	Sound Freq. Mc. Carrier	Receiver Freq. Mc. R-F Osc.	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 14.

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 15.

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 17. 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 serious. 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 14 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.

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.

ALIGNMENT TABLE

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

STEP No.	CONNECT 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, VII6)	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 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, VII5)	21.00 reduced output	1st sound i-f grid (pin 1, V115)	21.00 reduced output	Terminal A of T110 in series with 33K	"	Sweep output reduced to provide 0.3 volt p-to-p on scope	T110 (top and bot.) for max. gain and symmetry of 21.00 mc.	Fig. 13 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 v. scale. Rec. 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.	"
14	"	25.3	"	—	"	"	"	T102 (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
15	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.									
16	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
17			"				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
18	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. 16 (8)
19	"	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
20	"	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. 16 (6)
21	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
22	Repeat steps 19, 20 and 21 until the specified conditions are obtained.									
23	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
24	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. 16 (8)
25	"	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. 16 (13)
26	"	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
27	"	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. 16
28	"	199.25 203.75		channel 11	"	—	"	Rec. on chan. 11	"	Fig. 16 (11)
29	"	193.25 197.75	"	channel 10	"	—	"	Rec. on chan. 10	"	Fig. 16 (10)
30	"	187.25 191.75	"	channel 9	"	—	"	Rec. on chan. 9	"	Fig. 16 (9)
31	"	181.25 185.75	"	channel 8	"	—	"	Rec. on chan. 8	"	Fig. 16 (8)
32	"	175.25 179.75	"	channel 7	"	—	"	Rec. on chan. 7	"	Fig. 16 (7)
33	If the response of any channel (steps 27 through 32) is below 80% at either marker, repeat step 24 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.									
34	Repeat step 23. If the oscillator is off frequency overshoot the adjustment of C1 and correct by adjusting L43.									
35	Repeat steps 27 through 34 until all requirements are obtained.									
36	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. 11
37	"	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. 16
38	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. 37.		Fig. 9 Fig. 10
39	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. 16 (5)
40	"	67.25 71.75	"	channel 4	"	—	"	Rec. on chan. 4		Fig. 16 (9)
41	"	61.25 65.75	"	channel 3	"	—	"	Rec. on chan. 3	"	Fig. 16 (3)
42	"	55.25 59.75	"	channel 2	"	—	"	Rec. on chan. 2	"	Fig. 16 (2)
43	Likewise check channels 7 through 13, as outlined in steps 32 back through 27, stopping on channel 13 for next step.									
44	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
45	"	209.75	"	—	"	230.75	"	Rec. on chan. 12	L11 as above	Fig. 11
46	"	203.75	"	—	"	224.75	"	Rec. on chan. 11	L10 as above	Fig. 11
47	"	197.75	"	—	"	218.75	"	Rec. on chan. 10	L9 as above	Fig. 11
48	"	191.75	"	—	"	212.75	"	Rec. on chan. 9	L8 as above	Fig. 11
49	"	185.75	"	—	"	206.75	"	Rec. on chan. 8	L7 as above	Fig. 11
50	"	179.75	"	—	"	200.75	"	Rec. on chan. 7	L6 as above	Fig. 11
51	"	87.75	"	—	"	108.75	"	Rec. on chan. 6	L5 as above	Fig. 11
52	"	81.75	"	—	"	102.75	"	Rec. on chan. 5	L4 as above	Fig. 11
53	"	71.75	"	—	"	92.75	"	Rec. on chan. 4	L3 as above	Fig. 11
54	"	65.75	"	—	"	86.75	"	Rec. on chan. 3	L2 as above	Fig. 11
55	"	59.75	"	—	"	80.75	"	Rec. on chan. 2	L1 as above	Fig. 11
56	Repeat steps 44 through 55 as a check.									
57	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. 16 (8)
58	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.									
59	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.									

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									
60	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. 14
61	"	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. 15

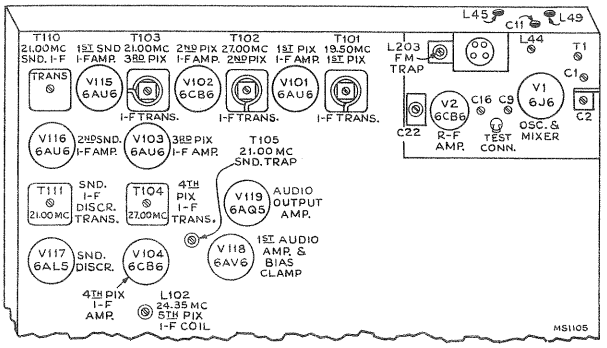


Figure 8—Top Chassis Adjustments

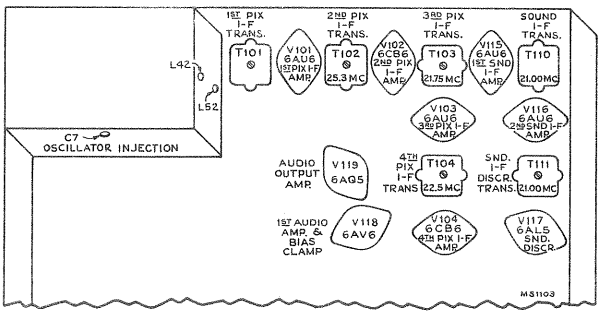


Figure 9—Bottom Chassis Adjustments

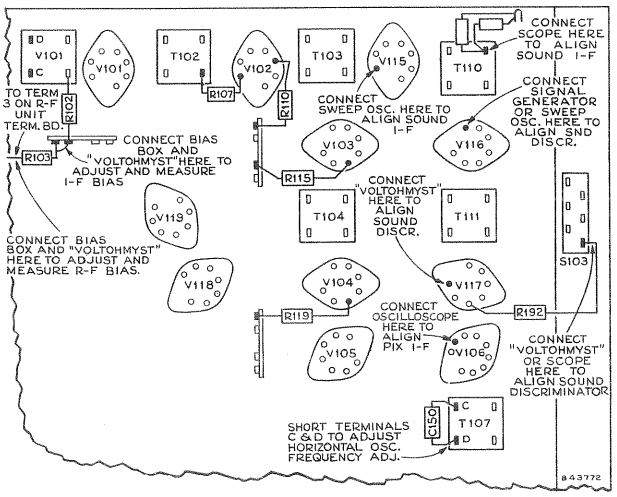


Figure 10—Test Connection Points

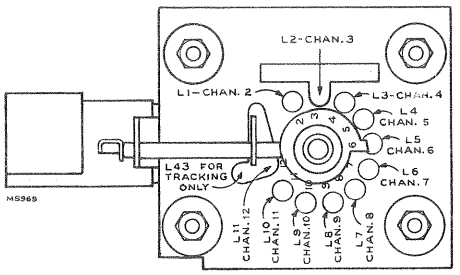


Figure 11—R-F Oscillator Adjustments

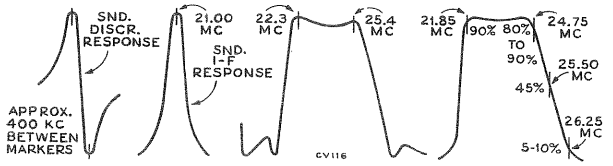


Figure 12 Discriminator Response

Figure 13 Sound I-F Response

Figure 14 T1 and T101 Response

Figure 15 Overall I-F R-F Response

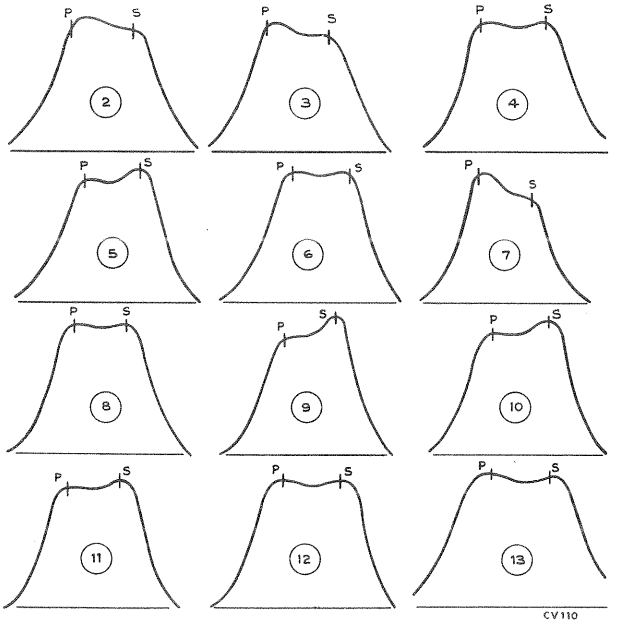


Figure 16—R-F Response

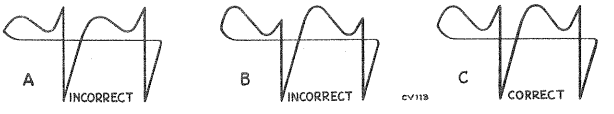


Figure 17—Horizontal Oscillator Waveforms

TEST PATTERN PHOTOGRAPHS

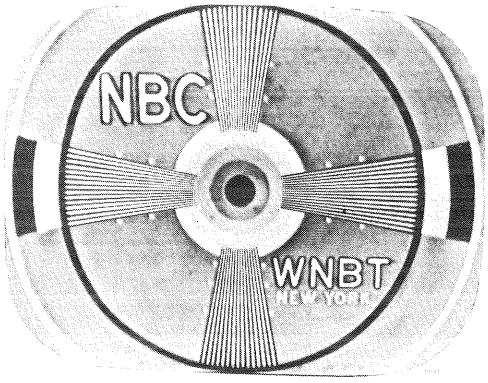


Figure 18—Normal Picture

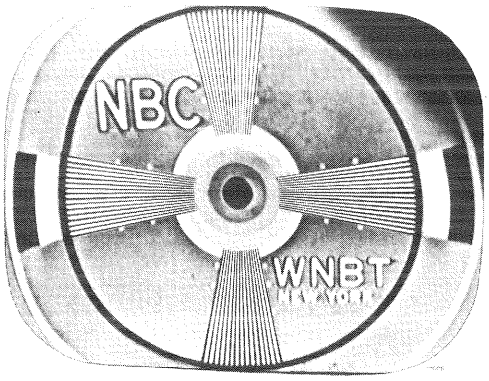


Figure 19—Focus Magnet and Ion Trap Magnet Misadjusted

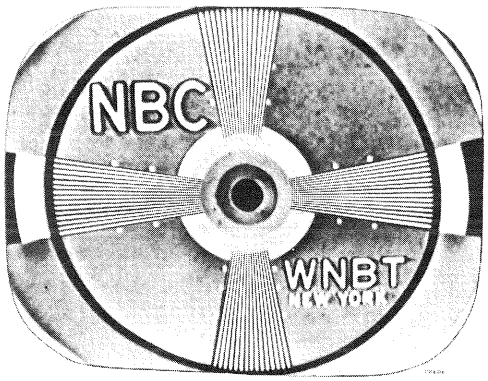


Figure 20—Horizontal Linearity Control Misadjusted (Picture Cramped in Middle)

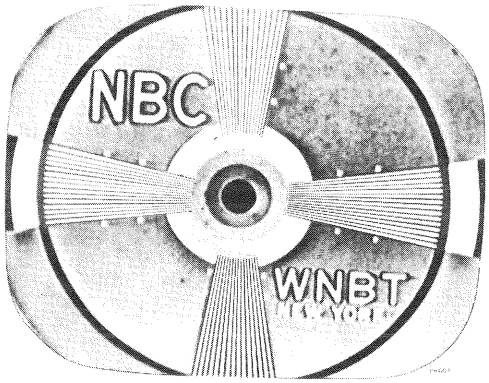


Figure 21—Width Control Misadjusted

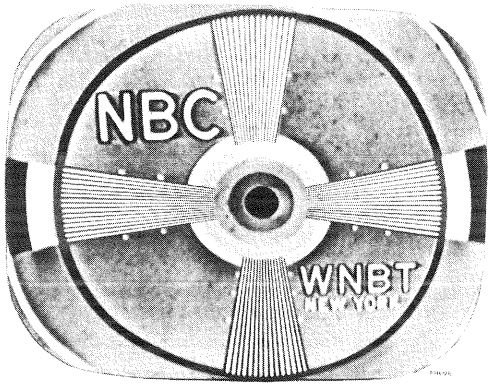


Figure 22—Horizontal Drive Control Misadjusted

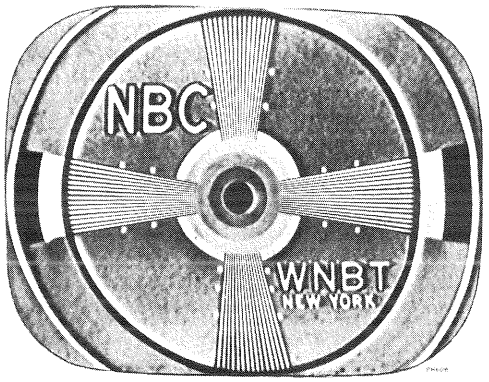


Figure 23—Transients

Figure 24—Test Pattern Showing Out of Sync Condition When Horizontal Hold Control Is in a Counter-clockwise Position—Just Before Pulling Into Sync

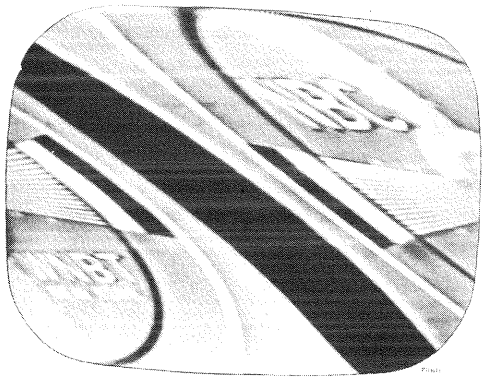


Figure 25—Test Pattern Showing Out of Sync Condition When Horizontal Hold Control Is at the Maximum Clockwise Position

TELEVISION SERVICE SUGGESTIONS

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

NO RASTER ON KINESCOPE:

(1) Incorrect adjustment of ion trap magnet. Magnet reversed either front to back or top to bottom.

(2) V112 or V113 inoperative. Check waveforms on grids and plates.

(3) No high voltage—if horizontal deflection is operating as evidenced by the correct waveform on terminal 1 of high voltage transformer, the trouble can be isolated to the 1B3GT circuit. Either the T108 high voltage winding is open, the 1B3GT tube is defective, its filament circuit is open, C158 is shorted, or R179 is open.

(4) V111 circuit inoperative—Refer to schematic and waveform chart.

(5) Damper tube (V114) inoperative.

(6) Defective kinescope.

(7) R134 open.

(8) No receiver plate voltage—filter capacitor shorted—or filter choke open.

NO VERTICAL DEFLECTION:

(1) V109 or V110 inoperative. Check voltage and waveforms on grids and plates.

(2) T106 open.

(3) Vertical deflection coils open.

SMALL RASTER:

(1) Low Plus B or low line voltage.

(2) V112 defective.

POOR VERTICAL LINEARITY:

(1) If adjustments cannot correct, change V110.

(2) Vertical output transformer T106 defective.

(3) V109 defective—check voltage and waveforms on grid and plate.

(4) C141, R155, C132A or C132C defective.

(5) Low plate voltage—check rectifiers and capacitors in supply circuits.

(6) If height is insufficient, try changing V109.

POOR HORIZONTAL LINEARITY:

(1) If adjustments do not correct, change V112 or V114.

(2) T108 or L113 defective.

(3) C156 or C157 defective.

WRINKLES ON LEFT SIDE OF RASTER:

(1) C155, R160 or C123 defective.

(2) Defective yoke.

PICTURE OUT OF SYNC HORIZONTALLY:

(1) T107 incorrectly tuned.

(2) R167, R168 or R169 defective.

TRAPEZOIDAL OR NON SYMMETRICAL RASTER:

(1) Improper adjustment of focus magnet or ion trap magnet.

(2) Defective yoke.

RASTER AND SIGNAL ON KINESCOPE BUT NO SOUND:

(1) R-F oscillator off frequency.

(2) Sound i-f, discriminator or audio amplifier inoperative—check V115, V116, V117, V118, V119 and their socket voltages.

(3) T112 or C178 defective.

(4) Speaker defective.

SIGNAL AT KINESCOPE GRID BUT NO SYNC:

(1) AGC control switch S105 misadjusted.

(2) V107B, inoperative. Check voltage and waveforms at its grid and plate.

SIGNAL ON KINESCOPE GRID BUT NO VERTICAL SYNC:

(1) Check V109 and associated circuit—C140, R200, etc.

(2) Integrating network inoperative—Check.

(3) R148, R149, R150, R151, R152, R153, R154, R201, R202, C159 or C179 defective.

(4) Gas current, grid emission or grid cathode leakage in V109. Replace.

(5) If C188 is small or missing, interlace will be poor.

SIGNAL ON KINESCOPE GRID BUT NO HORIZONTAL SYNC:

(1) T107 misadjusted—readjust as instructed on page 11.

(2) V111 inoperative—check socket voltages and waveforms.

(3) T107 defective.

(4) C144, C143A, C145, C146, C147, C148, or C150 defective.

(5) If horizontal speed is completely off and cannot be adjusted check R167, R168, R169, R170, R171, R173 and R215.

SOUND AND RASTER BUT NO PICTURE OR SYNC:

(1) Picture i-f, detector or video amplifier inoperative—check V103, V104, V105 and V106—check socket voltages.

(2) Bad contact to kinescope grid.

PICTURE STABLE BUT POOR RESOLUTION:

(1) V105 or V106 defective.

(2) Peaking coils defective—check for specified resistance.

(3) Make sure that the focus control operates on both sides of proper focus.

(4) R-F and I-F circuits misaligned.

PICTURE SMEAR:

(1) R-F or I-F circuits misaligned.

(2) Open peaking coil.

(3) This trouble can originate at the transmitter—check on another station.

PICTURE JITTER:

(1) AGC control switch S105 misadjusted.

(2) If regular sections at the left picture are displaced change V112.

(3) Vertical instability may be due to loose connections or noise.

(4) Horizontal instability may be due to unstable transmitted sync.

RASTER BUT NO SOUND, PICTURE OR SYNC:

(1) Defective antenna or transmission line.

(2) R-F oscillator off frequency.

(3) R-F unit inoperative—check V1, V2.

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.

DARK VERTICAL LINE ON LEFT OF PICTURE:

(1) Reduce horizontal drive and readjust width and horizontal linearity.

(2) Replace V112.

LIGHT VERTICAL LINE ON LEFT OF PICTURE:

(1) C155 defective.

(2) V114 defective.

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.

Figures 26 through 30 show the response of the various stages obtained in the above manner. The curves shown are typical although some variation between receivers can be expected. Relative stage gain is not shown.

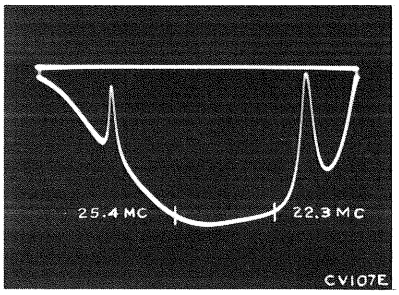


Figure 26—Response of Converter and First Pix I-F Transformer

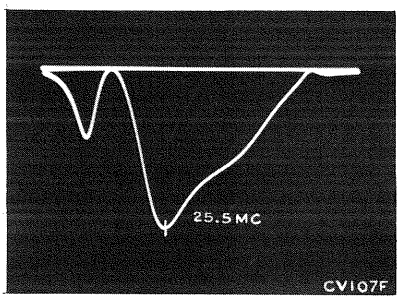


Figure 27—Response of Second Pix I-F Transformer

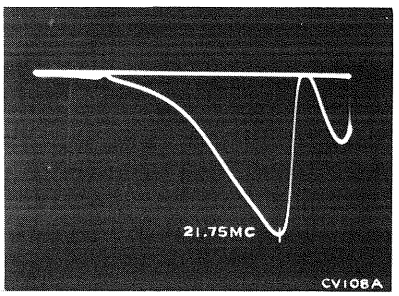


Figure 28—Response of Third Pix I-F Transformer

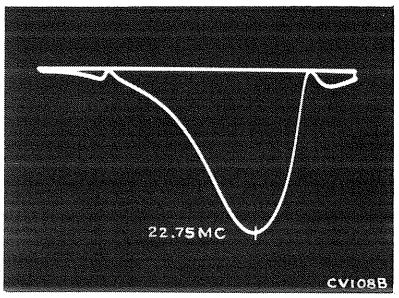


Figure 29—Response of Fourth Pix I-F Transformer

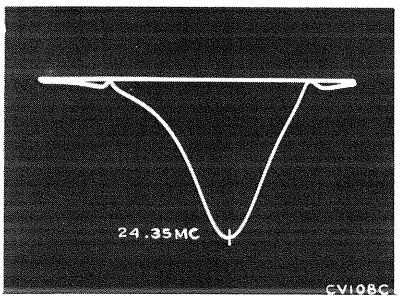


Figure 30—Response of Fifth Pix I-F Coil

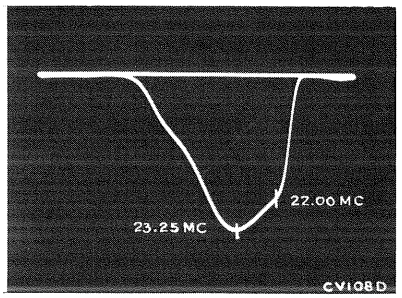


Figure 31—Response from First Pix I-F Grid to Pix Det.

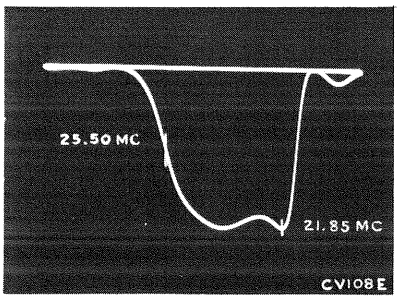


Figure 32—Overall Pix I-F Response

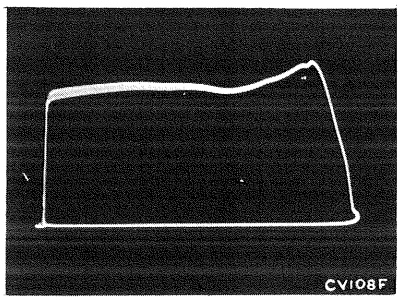


Figure 33—Video Response at Average Contrast

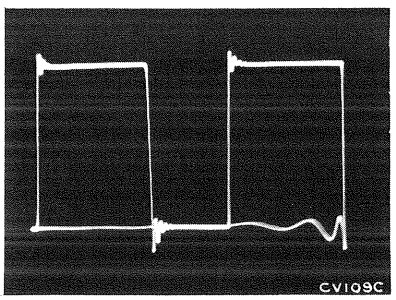


Figure 34—Video Response (100KC Square Wave)

WAVEFORM PHOTOGRAPHS

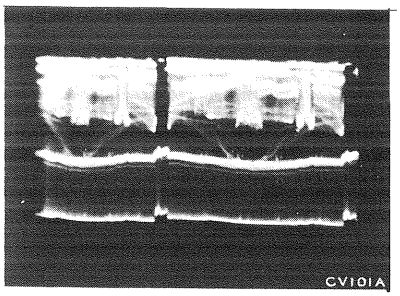
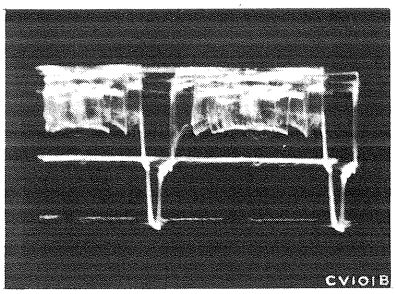
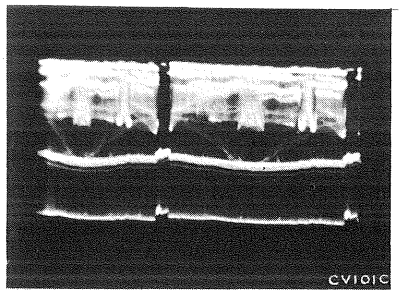


Plate of Picture Detector
(Pin 2 of V105) (6AL5)

Figure 35—Vertical (Oscilloscope Synced to ½ of Vertical Sweep Rate) (5.5 Volts PP)

Figure 36—Horizontal (Oscilloscope Synced to ½ of Vertical Sweep Rate) (5.5 Volts PP)

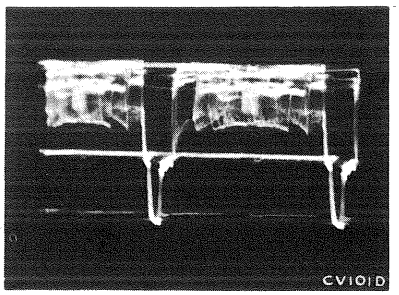




Grid of 1st Video Amplifier
(Pin 2 of V106) (12AU7)

Figure 37—Vertical (5.3 Volts PP)

Figure 38—Horizontal (5.3 Volts PP)



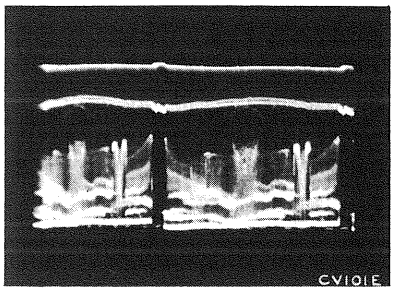
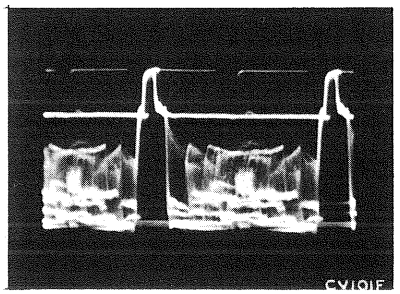
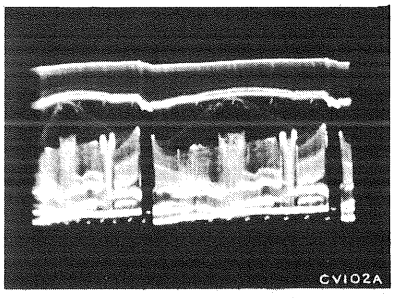


Plate of 1st Video Amplifier
(Pin 1 of V106) (12AU7)
Voltages depend on setting of Pix control

Figure 39—Vertical (2-18 Volts PP)

Figure 40—Horizontal (2-18 Volts PP)

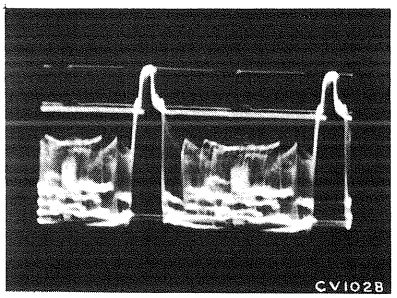




Grid of 2nd Video Amplifier
(Pin 7 of V106) (12AU7)
Voltages depend on setting of Pix control

Figure 41—Vertical (2-18 Volts PP)

Figure 42—Horizontal (2-18 Volts PP)



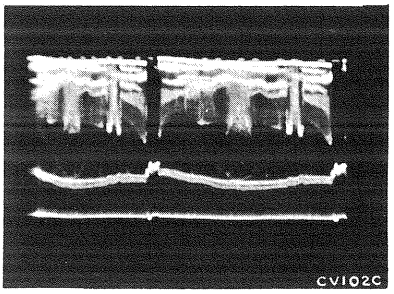
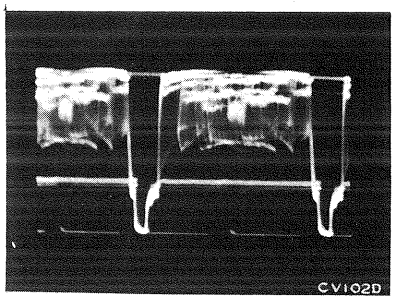
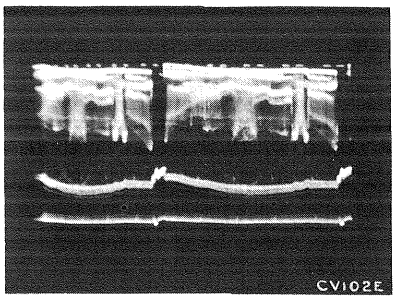


Plate of 2nd Video Amplifier
(Picture Max.)
(Pin 6 of V106) (12AU7)
Voltages depend on setting of Pix control

Figure 43—Vertical (15-90 Volts PP)

Figure 44—Horizontal (15-90 Volts PP)

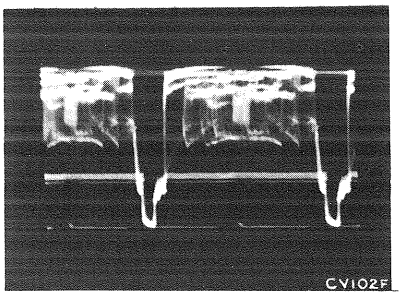


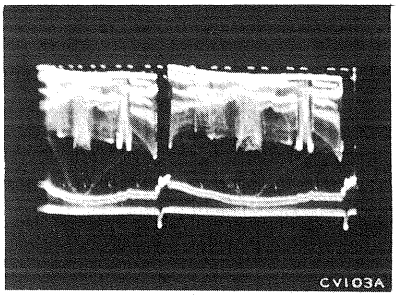


Input to Kinescope (Junction of R121 and C192) (Picture Max.)
Voltages depend on setting of Pix control

Figure 45—Vertical (15-90 Volts PP)

Figure 46—Horizontal (15-90 Volts PP)

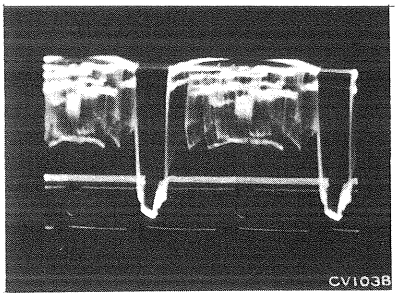


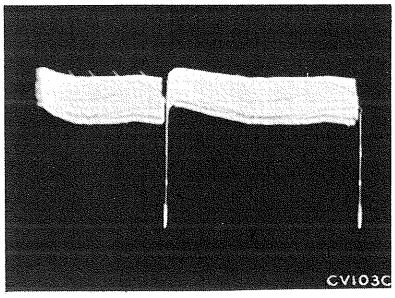


Cathode of D-C Restorer (Pin 3 of V107A) (12AU7)
Voltages depend on setting of Pix control

Figure 47—Vertical (11-80 Volts PP)

Figure 48—Horizontal (11-80 Volts PP)

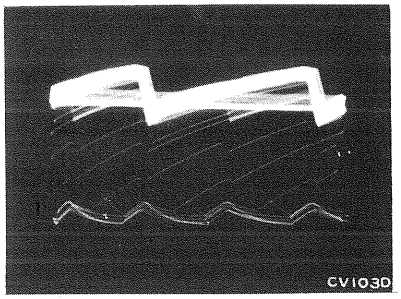


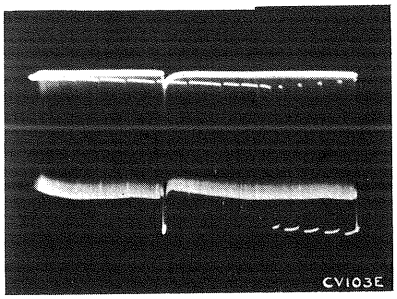


Grid of D-C Restorer (Pin 2 of V107A) (12AU7)
Voltages depend on setting of Pix control

Figure 49—Vertical (3-10 Volts PP)

Figure 50—Horizontal (3-10 Volts PP)

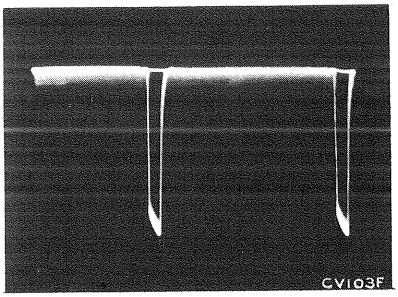




Grid of Sync Separator (Pin 4 of V109A) (6SN7GT)
Voltages depend on setting of Pix control

Figure 51—Vertical (11-14 Volts PP)

Figure 52—Horizontal (11-14 Volts PP)



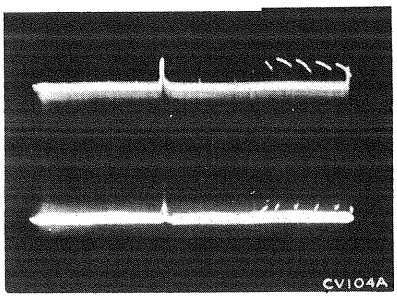
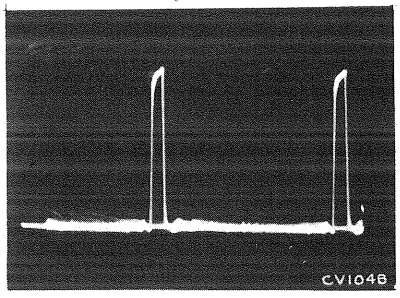


Plate of Sync Separator (Pin 5 of 109A) (6SN7GT)

Figure 53—Vertical (32 Volts PP)

Figure 54—Horizontal (32 Volts PP)



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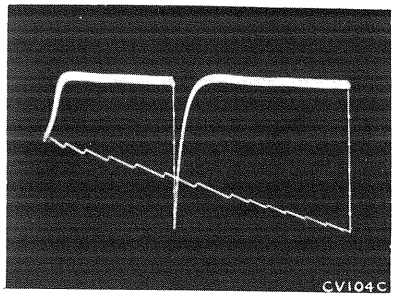
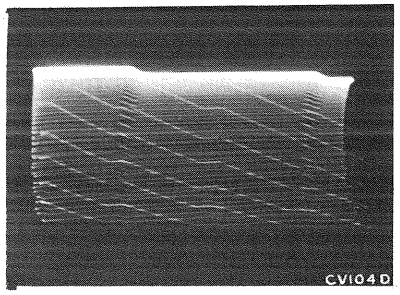


Cathode of Sync Separator (Pin 6 of V109A) (6SN7GT)

Figure 55—Vertical (1.2 Volts PP)

Figure 56—Horizontal (1.2 Volts PP)



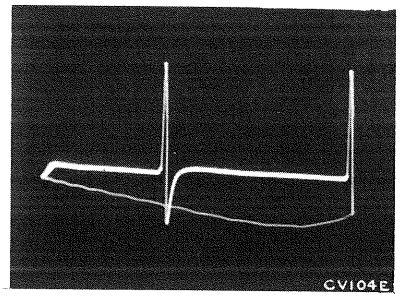
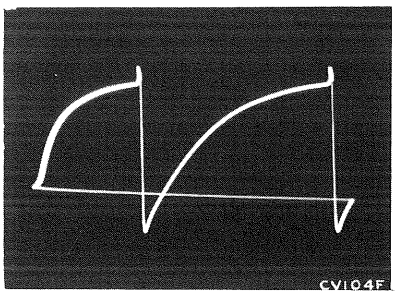


Figure 57—Output of Integrating Network (Junction of C139, C140 and R147) (8.5 Volts PP)

Figure 58—Grid of Vertical Oscillator (75 Volts PP) (Pin 1 of V109B). (6SN7GT)



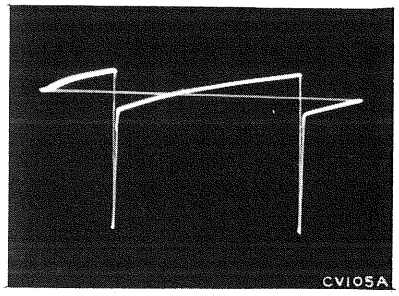
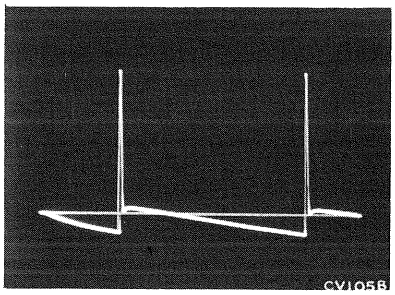


Figure 59—Grid of Vertical Output (110 Volts PP) (Pin 1 of V110) (6AQ5)

Figure 60—Plate of Vertical Output (700 Volts PP) (Pin 5 of V110) (6AQ5)



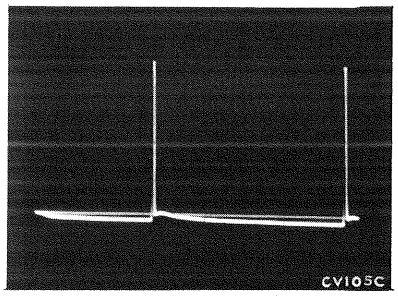
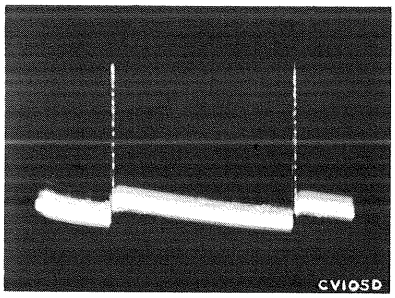


Figure 61—Junction of C159, C179 and R202 (275 Volts PP)

Figure 62—Input of Vertical Deflection Coils (20 Volts PP) (Junction of Green Lead of T106 and Green Lead of Yoke)



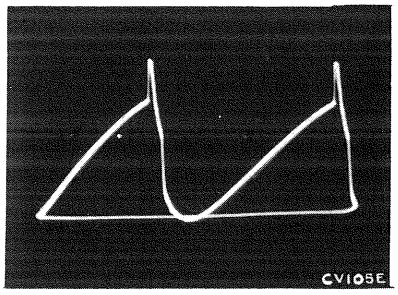
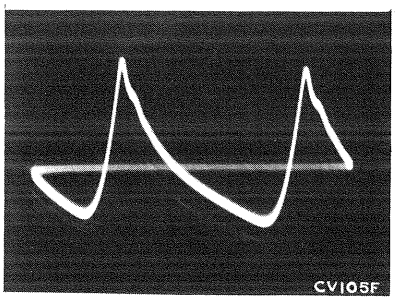


Figure 63—Grid of Horizontal Oscillator Control (27 Volts PP) (Pin 1 of V111) (6SN7GT)

Figure 64—Cathode of Horizontal Oscillator Control (1.0 Volts PP) (Pin 3 of V111) (6SN7GT)



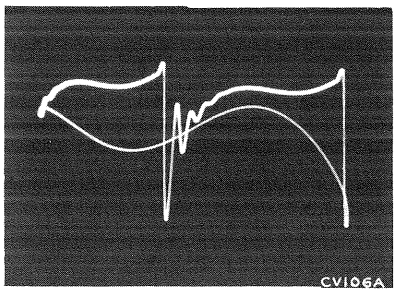
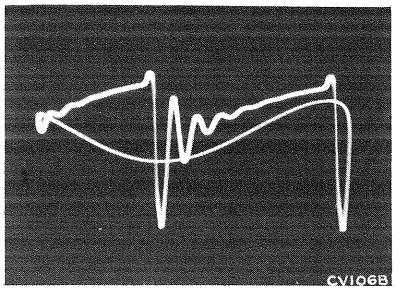


Figure 65—Junction of R163, R164 and R170 (70 Volts PP)

Figure 66—Grid of Horizontal Oscillator (290 Volts PP) (Pin 4 of V111) (6SN7GT)



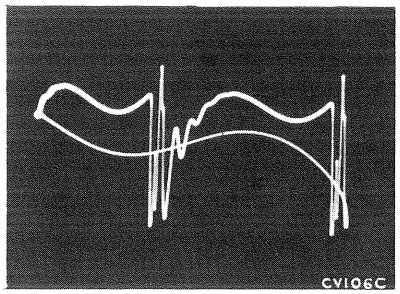
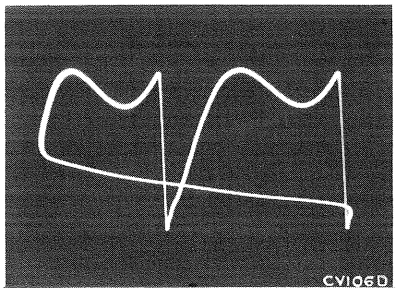


Figure 67—Plate of Horizontal Oscillator (150 Volts PP) (Pin 5 of V111) (6SN7GT)

Figure 68—Terminal "C" of T107 (100 Volts PP)



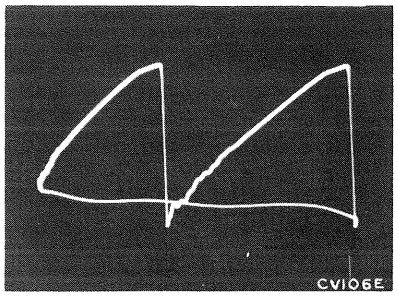
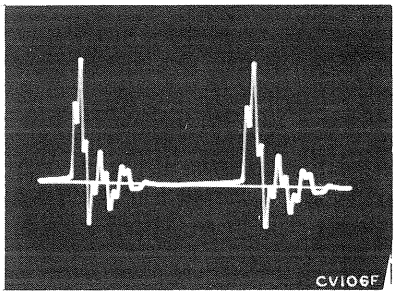


Figure 69—Input to Horizontal Output Tube (60-80 Volts PP) Depends on setting of drive control (Junction of C152 and C143B)

Figure 70—Plate of Horizontal Output (Approx. 5000 Volts PP) (Measured Through a Capacity Voltage Divider Connected from Top Cap of V102 to Ground)



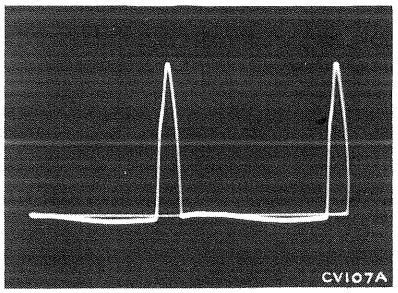
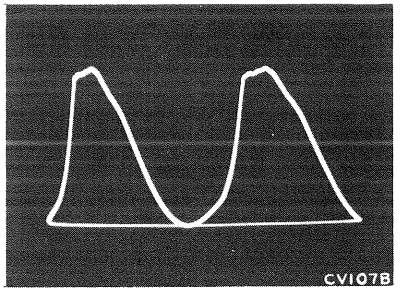


Figure 71—Cathode of Damper (2100-2700 Volts PP) Depends on setting of width control (Pin 3 of V114) (6W4GT)

Figure 72—Plate of Damper (90-130 Volts PP) Depends on setting of width control (Pin 5 of V114) (6W4GT)



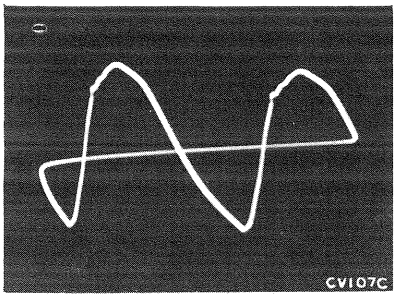
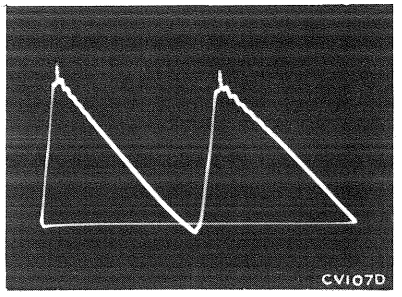


Figure 73—Junction of Yoke and Width Control (80-145 Volts PP) Depends on setting of width control

Figure 74—Voltage Across Width Control (0-85 Volts PP) Depends on setting of width control



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	250	2	1.8	1	0	9.3	2.7	
			No Signal	5	166	6	248	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	6.0	—	—	0.12	—	
			No Signal	7	−2.45	—	—	1	5.5	—	—	<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	−1.3	7.5	—	At maximum contrast
			No Signal	6	191	—	—	8	2.6	7	−.9	11.1	—	
			2500 Mu. V. Signal	6	189	—	—	8	2.75	7	−.5	12.5	—	At minimum contrast
			No Signal	6	188	—	—	8	2.69	7	−.2	12.3	—	
V107	12AU7	D-C Rest. & Sync Sep.	2500 Mu. V. Signal	1	7.5	—	—	3	46.0	2	−4.6	<0.1	—	At maximum contrast
			No Signal	1	5.2	—	—	3	15.0	2	−1.0	<0.1	—	

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	12AU7	DC Rest Snyc Sep.	2500 Mu. V. Signal	6	8.6	—	—	8	58	7	0	—	—	At Maximum Contrast
			No Signal	6	6.2	—	—	8	14	7	0	—	—	
V108	14EP4	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
V109A	6SN7GT	Sync Amplifier	2500 Mu. V. Signal	5	70	—	—	6	10.2	4	8.6	—	—	
			No Signal	5	18	—	—	6	8.2	4	6.2	—	—	
V109B	6SN7 GT	Vertical Oscillator	2500 Mu. V. Signal	2	132	—	—	3	0	1	−13.2	0.15	—	
			No Signal	2	132	—	—	3	0	1	−12.0	0.15	—	
V110	6AQ5	Vertical Output	2500 Mu. V. Signal	5	290	6	290	2	22	1	−0.5	13.9	1.20	
			No Signal	5	290	6	290	2	22	1	−0.5	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	—	

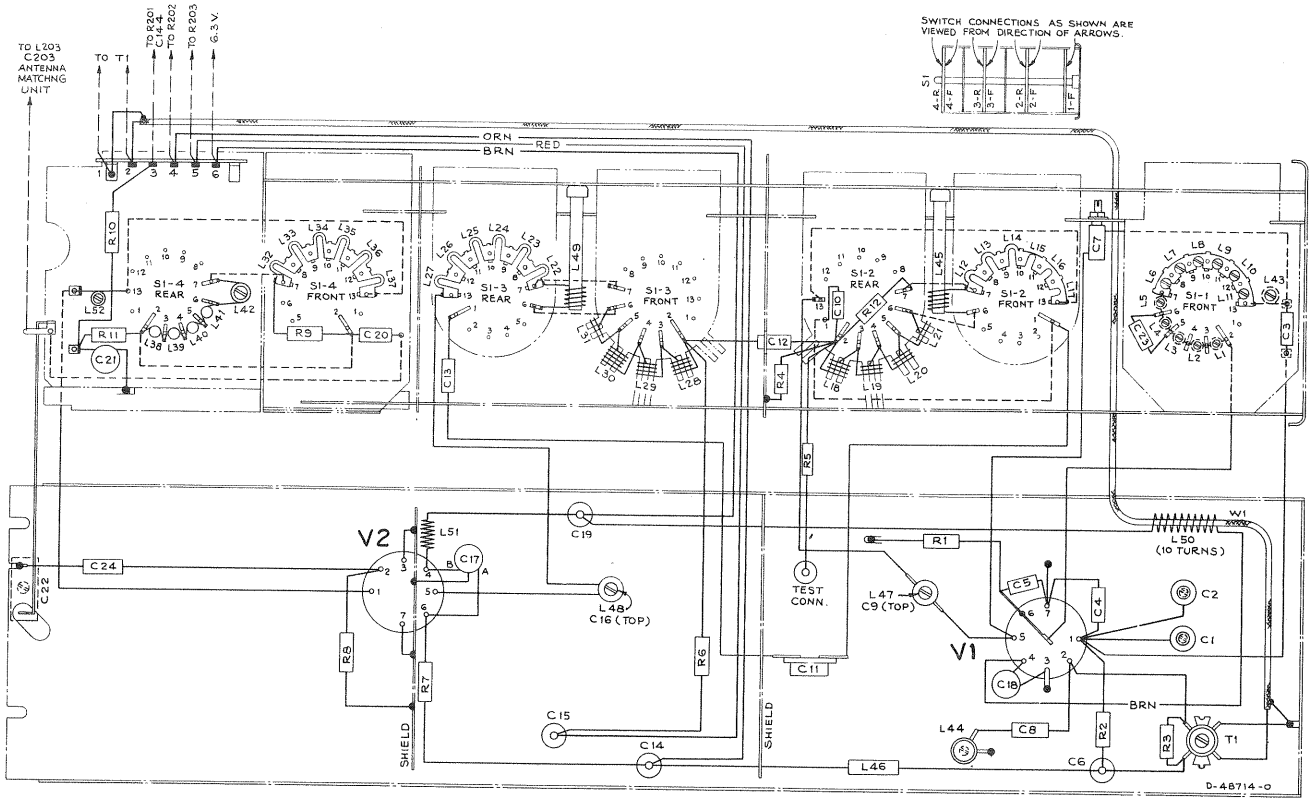


Figure 75—R-F Unit Wiring Diagram

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.

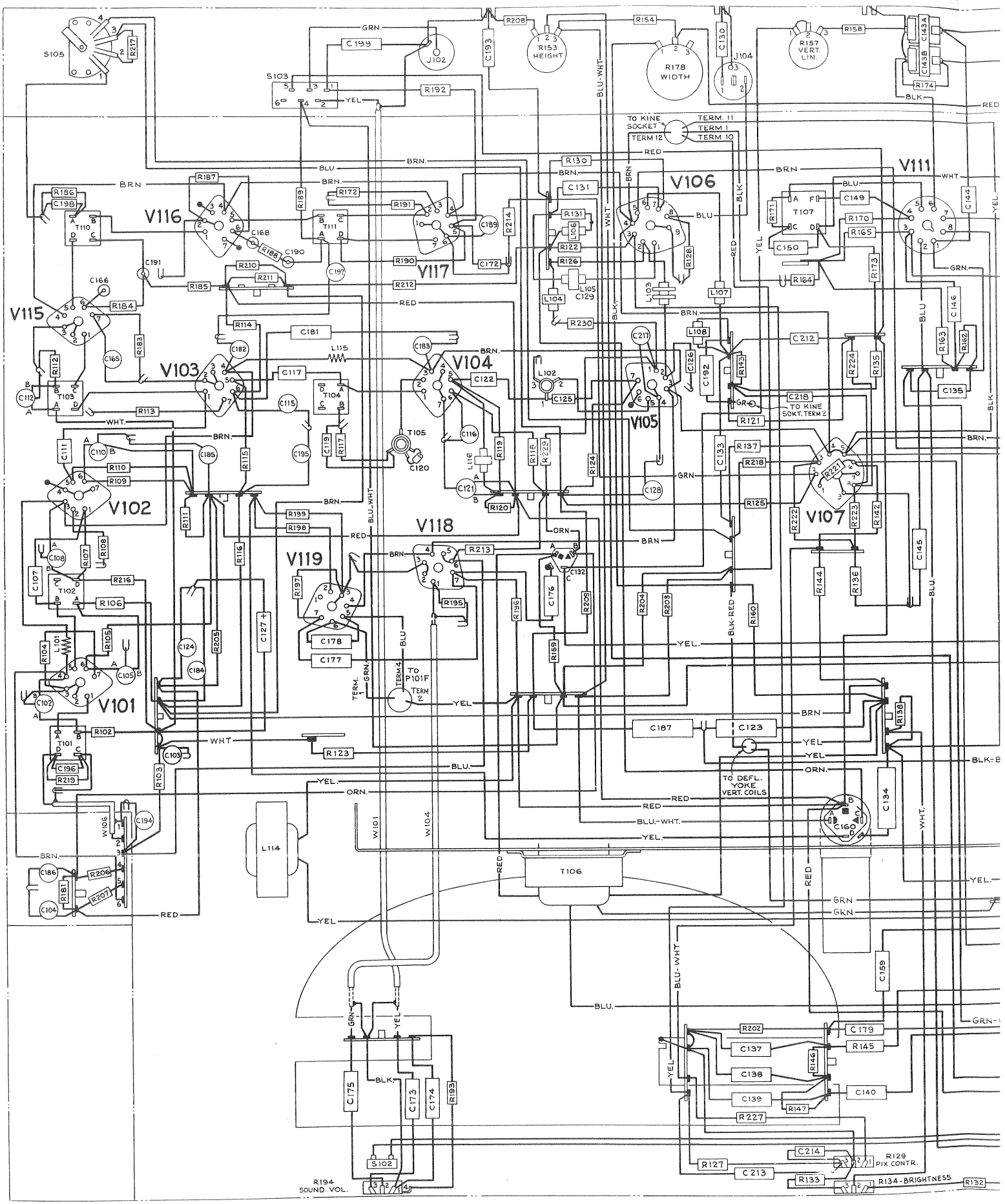
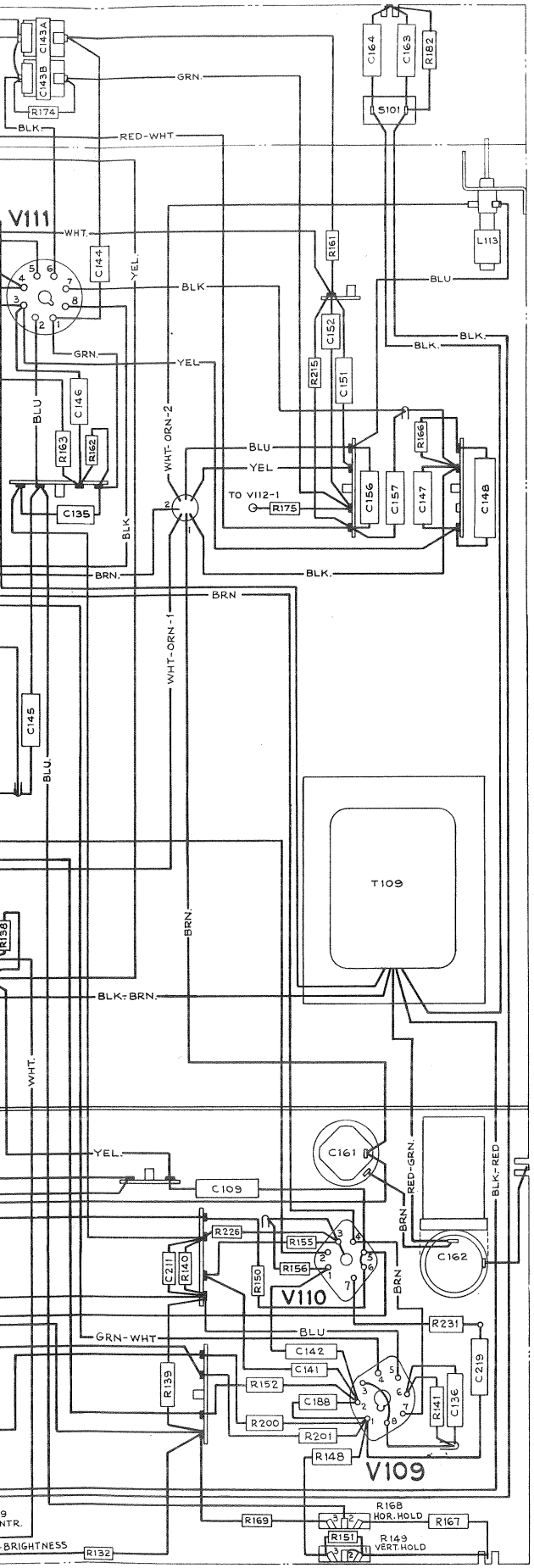
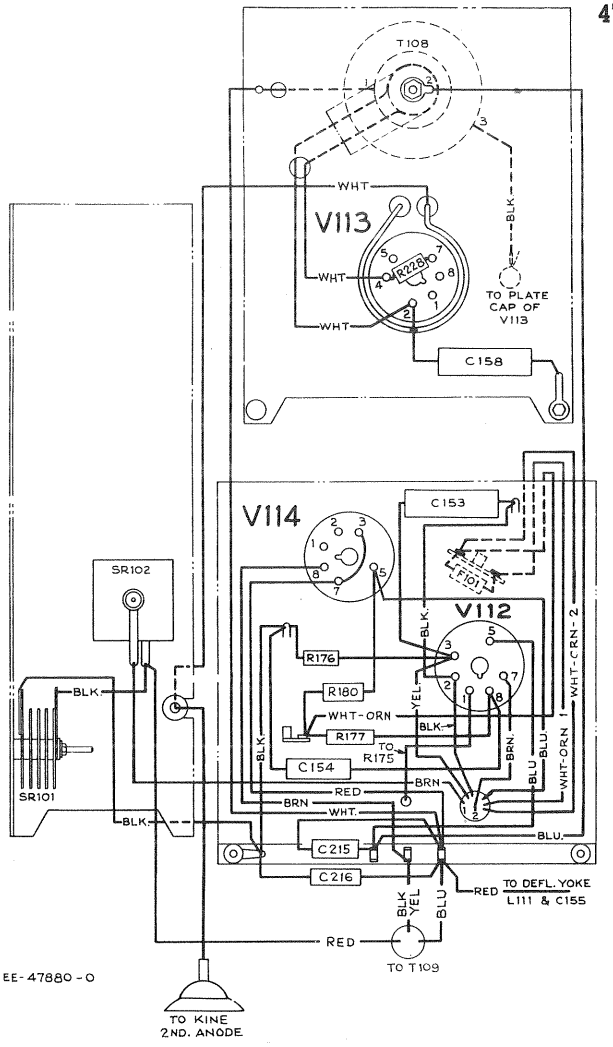


Figure 76—Chassis Wiring Diagr

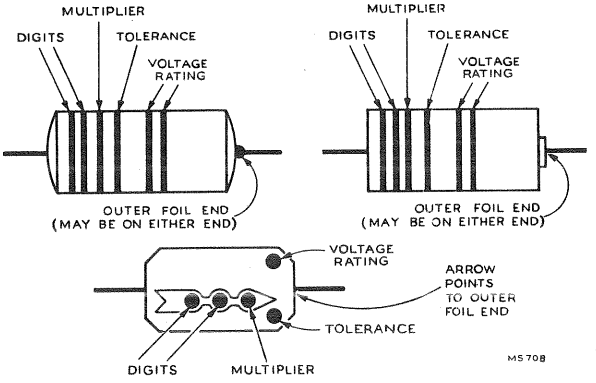
S WIRING DIAGRAM



s Wiring Diagram



COLOR CODES, MOULDED PAPER CAPACITORS



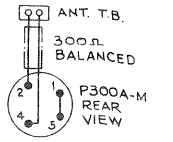
CAPACITY VALUE IN MMF

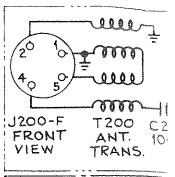
COLOR	DIGITS	MULTIPLIER
BLACK	0	1
BROWN	1	10
RED	2	100
ORANGE	3	1,000
YELLOW	4	10,000
GREEN	5	
BLUE	6	
VIOLET	7	
GRAY	8	
WHITE	9	

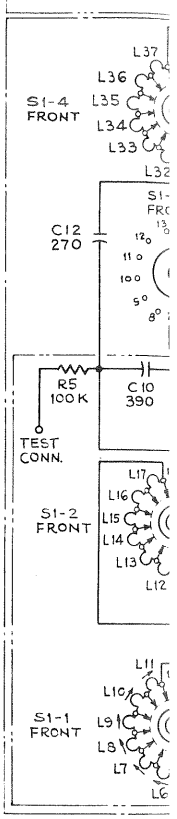
TOLERANCE

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

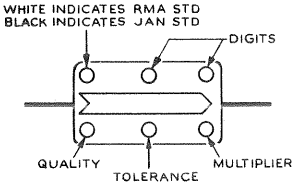
The Voltage Rating is given in hundreds of volts. Only one band is employed for ratings under 1,000 volts. Two bands are employed for ratings over 1,000 volts. Use digit column to read voltage rating.







RMA COLOR CODE, FIXED



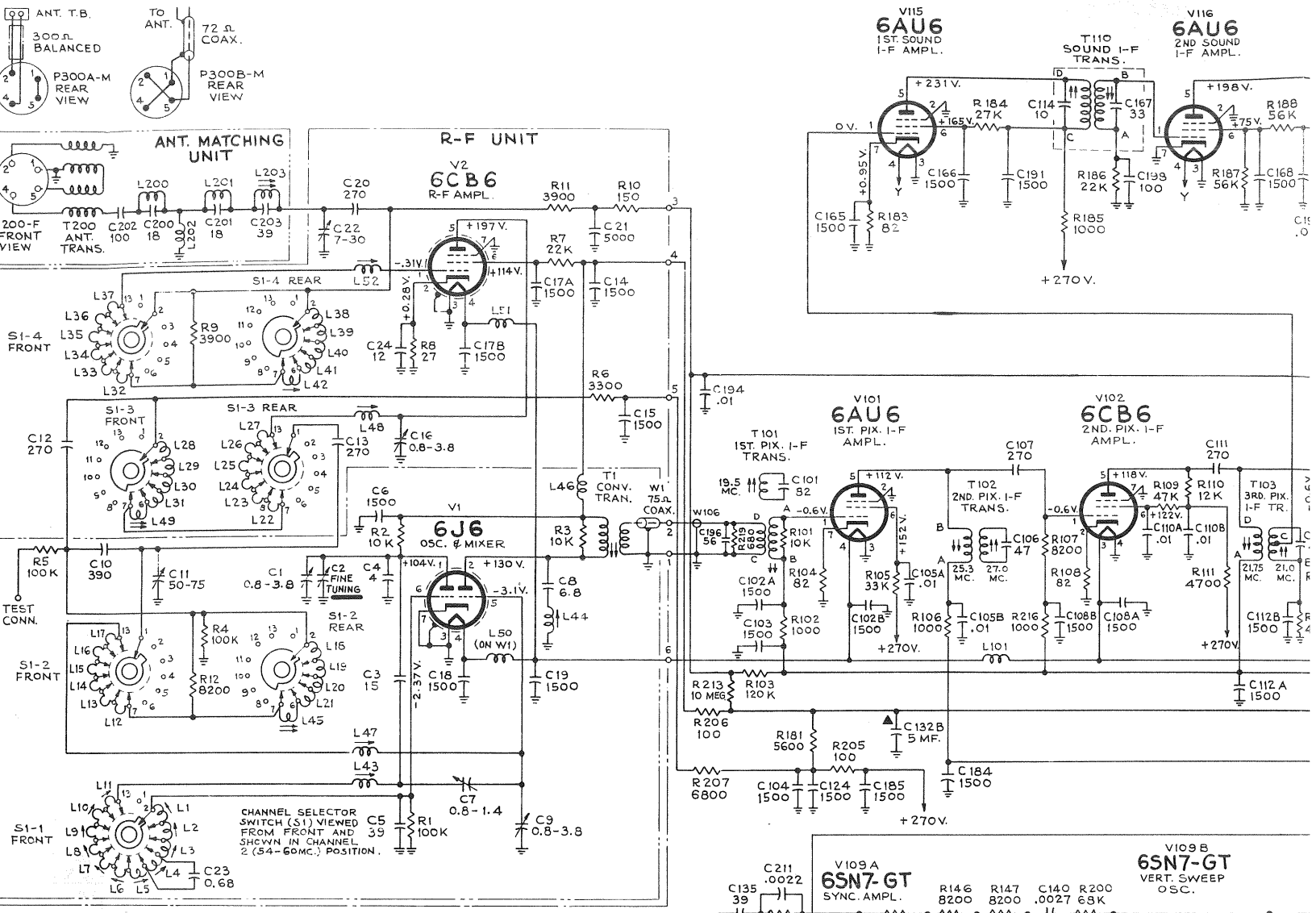
RMA FIXED MICA CAPACITORS RATED AT 50

TOLERANCE

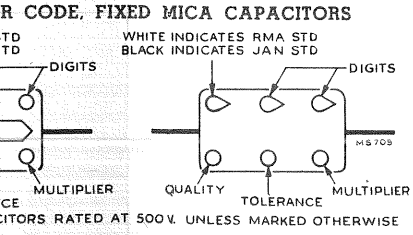
COLOR	TOLERANCE	COLOR
RED	±2%	BLACK
GREEN	±5%	BROWN
SILVER	±10%	RED
BLACK	±20%	ORANGE

All resistance values in ohms 1000.

All capacitance values less th MF and above 1 in MMF unless wise noted.



R CODE, FIXED MICA CAPACITORS



CITORS RATED AT 500 V. UNLESS MARKED OTHERWISE

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	

QUALITY

RANCE	COLOR	CLASS	COLOR	CLASS
2%	BLACK	A	YELLOW	D
5%	BROWN	B	GRAY	I
10%	RED	C	WHITE	J
20%	ORANGE	D		

values in ohms. K =

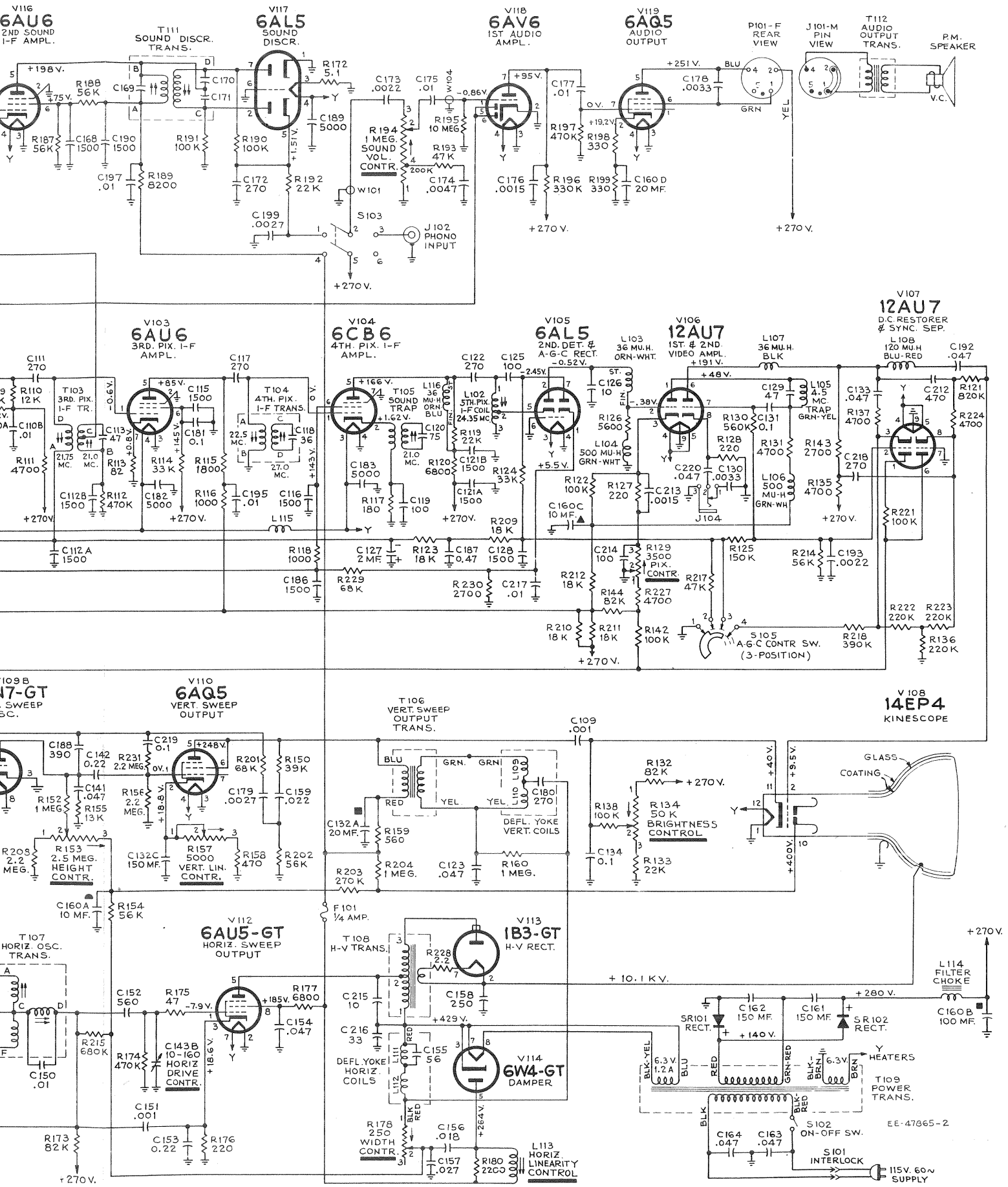
e values less than 1 in
1 in MMF unless other-

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

Direction of arrows at controls indicates clockwise rotation.

In some receivers, R213 was 4.7 meg and was connected from R-F unit terminal 3 to junction of R207 and C104. R103 was 33K, C217 was omitted, R229 and R230 were omitted and pin 1 of V105 was connected to ground. C130 was .0015 mfd, R135 was 6800. L117 (500 muh) and R225 (10K) were removed and replaced by R143. C218 was omitted.

In some r
R144 was 10
was 12K, R20
C140 was .00
R231 and C21



In some receivers, R142 was 47K, R144 was 100K, R150 was 27K, R155 was 12K, R202 was 39K, R227 was 3300, C140 was .001 and C179 was .0047 mfd. R231 and C219 were omitted. R220, 100K connected between V107-1 and R142 was removed.

In some receivers, R179, 1 meg was employed as high voltage filter and was connected between V113-2 and the kinescope.

In some receivers, C220 was omitted and J104-2 was connected to V106-8.

In some receivers, R151, 2.2 meg was connected between R149-3 and ground.

In some receivers, R182, 100K was connected from S101 to ground.

Figure 77—Circuit Schematic Diagram

STOCK No.	DESCRIPTION
	R-F UNIT ASSEMBLY KRK8C
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, C15, 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, 0.65-1.2 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—RCA 75166
75182	Coil—Trimmer coil (1½ turns) with adjustable inductance core and capacitor stud (screw adjustment) for converter 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—Converter 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:—
503027	27 ohms, ±10%, ½ watt (R8)
504115	150 ohms, ±20%, ½ watt (R10)
503233	3300 ohms, ±10%, ½ watt (R6)
503239	3900 ohms, ±10%, ½ watt (R9, R11)
503282	8200 ohms, ±10%, ½ watt (R12)
3078	10,000 ohms, ±5%, ½ watt (R3)
504310	10,000 ohms, ±20%, ½ watt (R2)
503322	22,000 ohms, ±10%, ½ watt (R7)
504410	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 ⅜" 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
76133	Shaft—Channel selector shaft and plate
76134	Shaft—Fine tuning shaft and cam
75168	Shield—Oscillator and converter 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
75478	Spring—Retaining spring for adjusting screws
73457	Spring—Return spring for fine 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—Converter 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) (S1-4, 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—Converter transformer (T1)
75190	Washer—Insulating washer (neoprene) for capacitor C7
73466	Washer—Insulating washer (round)

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES KCS 61
75235	Board—Hi-voltage shield terminal board (3 contact)
75228	Bracket—Focus magnet mounting bracket—upper
75229	Bracket—Focus magnet mounting bracket—bottom
53511	Capacitor—Ceramic, 10 mmf. (C126)
75217	Capacitor—Mica trimmer dual 10-160 mmf. (C143A, C143B)
76294	Capacitor—Ceramic, 10 mmf. H.V. (C215)
76295	Capacitor—Ceramic, 33 mmf. H.V. (C216)
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, C198, C214)
75248	Capacitor—Mica, 220 mmf. (C149)
75244	Capacitor—Ceramic, 270 mmf. (C172)
76303	Capacitor—Ceramic, 270 mmf. (C218)
73091	Capacitor—Mica, 270 mmf. (C107, C111, C117, C122)
73094	Capacitor—Mica, 390 mmf. (C188)
75198	Capacitor—Ceramic, 470 mmf. (C212)
74250	Capacitor—Mica, 560 mmf. (C152)
75166	Capacitor—Ceramic, 1500 mmf. (stand-off type) (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)
73960	Capacitor—Ceramic, 10,000 mmf. (C194, C195, C197, C217)
75877	Capacitor—Ceramic, dual, 10,000 mmf. (C105A, C105B, C110A, C110B)
73747	Capacitor—Electrolytic, 2 mfd., 50 volts (C127)
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)
76142	Capacitor—Electrolytic, comprising 1 section of 20 mfd., 350 volts, 1 section of 5 mfd., 350 volts and 1 section of 150 mfd., 50 volts (C132A, C132B, C132C)
75220	Capacitor—Electrolytic, 150 mfd., 200 volts (C161, C162)
75250	Capacitor—Tubular, moulded paper, oil impregnated, .00025 mfd., 12,500 volts (C158)
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 (C176, C213)
73595	Capacitor—Tubular, paper, oil impregnated, .0022 mfd., 600 volts (C137, C173, C193, C211)
73599	Capacitor—Tubular, paper, oil impregnated, .0027 mfd., 600 volts (C140, C179, C199)
73795	Capacitor—Tubular, paper, oil impregnated, .0033 mfd., 600 volts (C130, C178)
73920	Capacitor—Tubular, paper, oil impregnated, .0047 mfd., 600 volts (C138, C139, C174)
73561	Capacitor—Tubular, paper, oil impregnated, .01 mfd., 400 volts (C175, C177)
73594	Capacitor, 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)
73815	Capacitor—Tubular, moulded paper, oil impregnated, .027 mfd., 1000 volts (C157)
75071	Capacitor, moulded paper, .047 mfd., 400 volts (C163, C164)
73553	Capacitor—Tubular, paper, oil impregnated, .047 mfd., 400 volts (C133, C145, C192, C220)
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, C134, C146, C181, C219)
73560	Capacitor—Tubular, paper, oil impregnated, 0.22 mfd., 200 volts (C153)
74957	Capacitor—Tubular, paper, oil impregnated, 0.22 mfd., 600 volts (C142)
73787	Capacitor—Tubular, paper, oil impregnated, .047 mfd., 200 volts (C136, C148, C187)
76140	Choke—Filter choke (L114)
76143	Clip—Tubular clip for mounting stand-off capacitor 75166
75224	Clip—Mounting clip for electrolytic 75220
76150	Clip—Anchor clip for ground braid
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)
75299	Coil—Peaking coil (36 muh) (L103)
71793	Coil—Peaking coil (36 muh) (L107)
76285	Coil—Peaking coil (36 muh) (L116, R119)
75253	Coil—Peaking coil (120 muh) (L108)
75252	Coil—Peaking coil (500 muh) (L104, L106)
35787	Connector—Phono input connector (J102)
74594	Connector—2 contact male connector for power cable
38853	Connector—4 contact female connector for antenna transformer (J200)
71789	Connector—Anode connector
5040	Connector—4 contact female connector for speaker cable (P101)
75237	Control—Volume control and power switch (R194, S102)
75215	Control—Horizontal and vertical hold control (R149, R168)

STOCK No.	DESCRIPTION
75216	Control—Picture and brightness control (R129, R134)
71441	Control—Vertical linearity control (R157)
71440	Control—Height control (R153)
74945	Control—Width control (R178)
71498	Core—Adjustable core and stud for F-M trap 75449
72772	Cover—Insulating cover for electrolytic 75220
74956	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 to mount ceramic tube socket
16058	Grommet—Rubber grommet for 2nd anode lead exit
76138	Hood—Deflection yoke hood complete with cushions
75482	Jack—Video jack (J104)
76137	Magnet—Focus magnet complete with adjustable plate and stud
76141	Magnet—Ion trap magnet
76144	Pad—Rubber pad for kinescope mounting strap (bottom) (4 req'd)
18469	Plate—Bakelite mounting plate for electrolytic #75220
76153	Plate—Hi-voltage transformer mounting plate (bakelite) complete with tube socket less transformer
75221	Rectifier—Selenium rectifier (SR101, SR102)
72066	Resistor—Wire wound, 2.2 ohms, 1/3 watt (R228)
72067	Resistor—Wire wound, 5.1 ohms, ½ watt (R172)
76410	Resistor—Wire wound, 220 ohms, 4 watts (R176)
76390	Resistor—Wire wound, 5600 ohms, 5 watts (R181)
	Resistor—Fixed, composition:—
504047	47 ohms, ±20%, ½ watt (R175)
503082	82 ohms, ±10%, ½ watt (R104, R108, R113, R183)
504110	100 oms, ±20%, ½ watt (R205, R206)
503118	180 ohms, ±10%, ½ watt (R117)
503122	220 ohms, ±10%, ½ watt (R127, R128)
513133	330 ohms, ±10%, 1 watt (R198, R199)
504147	470 ohms, ±20%, ½ watt (R158)
503156	560 ohms, ±10%, ½ watt (R159)
503168	680 ohms, ±10%, ½ watt (R219)
504210	1000 ohms, ±20%, ½ watt (R102, R106, R116, R118, R185, R216)
503218	1800 ohms, ±10%, ½ watt (R115)
504222	2200 ohms, ±20%, ½ watt (R141)
514222	2200 ohms, ±20%, 1 watt (R180)
503227	2700 ohms, ±10%, ½ watt (R143, R230)
503239	3900 ohms, ±10%, ½ watt (R166)
30494	4700 ohms, ±5%, ½ watt (R131)
503247	4700 ohms, ±10%, ½ watt (R137, R227)
513247	4700 ohms, ±10%, 1 watt (R111)
523247	4700 ohms, ±10%, 2 watts, (R135)
30734	5600 ohms, ±5%, ½ watt (R126)
523256	5600 ohms, ±10%, 2 watts (R181)
513268	6800 ohms, ±10%, 1 watt (R120)
523268	6800 ohms, ±10%, 2 watts (R177, R207)
14250	8200 ohms, ±5%, ½ watt (R107)
503282	8200 ohms, ±10%, ½ watt (R146, R147, R189, R226)
503310	10,000 ohms, ±10%, ½ watt (R140)
30436	12,000 ohms, ±5%, ½ watt (R171)
30866	12,000 ohms, ±5%, 1 watt (R110)
502313	13,000 ohms, ±5%, ½ watt (R155)
503318	18,000 ohms, ±10%, ½ watt (R123, R209)
513318	18,000 ohms, ±10%, 1 watt (R212)
523318	18,000 ohms, ±10%, 2 watts (R210, R211)
503322	22,000 ohms, ±10%, ½ watt (R133, R145, R186)
504322	22,000 ohms, ±20%, ½ watt (R192)
513322	22,000 ohms, ±10%, 1 watt (R169)
503327	27,000 ohms, ±10%, ½ watt (R184)
503333	33,000 ohms, ±10%, ½ watt (R105)
504333	33,000 ohms, ±20%, ½ watt (R114, R124)
523333	33,000 ohms, ±10%, 2 watts (R139)
513339	39,000 ohms, ±10%, 1 watt (R150)
503347	47,000 ohms, ±10%, ½ watt (R193, R217)
504347	47,000 ohms, ±20%, ½ watt (R109)
503356	56,000 ohms, ±10%, ½ watt (R154, R187, R188, R214)
513356	56,000 ohms, ±10%, 1 watt (R202)
504368	68,000 ohms, ±20%, ½ watt (R200, R201)
503368	68,000 ohms, ±10%, ½ watt (R229)
503382	82,000 ohms, ±10%, ½ watt (R132, R144)
513382	82,000 ohms, ±10%, 1 watt (R165, R173)
3252	100,000 ohms, ±5%, ½ watt, (R190, R191)
503410	100,000 ohms, ±10%, ½ watt (R138, R142, R221)
513410	100,000 ohms, ±10%, 1 watt (R122, R167)
503412	120,000 ohms, ±10%, ½ watt (R103)
503415	150,000 ohms, ±10%, ½ watt (R161)
504415	150,000 ohms, ±20%, ½ watt (R125)
503422	220,000 ohms, ±10%, ½ watt (R136, R222, R223)
54449	220,000 ohms, ±5%, 1 watt (R170)
503427	270,000 ohms, ±10%, ½ watt (R203)
503433	330,000 ohms, ±10%, ½ watt (R162, R196)
38892	330,000 ohms, ±5%, 1 watt (R164)
503439	390,000 ohms, ±10%, ½ watt (R218)
503447	470,000 ohms, ±10%, ½ watt (R174)
504447	470,000 ohms, ±20%, ½ watt (R112, R197)
503456	560,000 ohms, ±10%, ½ watt (R130, R148)
503468	Resistor—680,000 ohms, ±10%, ½ watt (R215)
503482	820,000 ohms, ±10%, ½ watt (R121, R163)
503510	1 megohm, ±10%, ½ watt (R152, R204)
504510	1 megohm, ±20%, ½ watt (R160)
503522	2.2 megohm, ±10%, ½ watt (R156)
504522	2.2 megohm, ±20%, ½ watt (R208, R231)
504610	10 megohm, ±20%, ½ watt (R195)
503610	10 megohms, ±10%, ½ watt (R213)
76151	Screw—#10-32 x 1" hex head screw to fasten kinescope retaining straps (2 req'd)
75083	Screw—#8-32 x 5/16" wing screw for mounting deflection yoke
76152	Screw—#10-32 x 1½" cross recessed round head screw for focus magnet adjustment

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
75236	Screw—#8-32 x 3/8" cross recessed binder head screw for focus magnet mounting (2 req'd)
73521	Shield—Tube shield for V105, V117
73584	Shield—Tube shield for V104, V116
76147	Shield—RF unit shield
75222	Socket—Tube socket, octal, ceramic, plate mounted
73117	Socket—Tube socket, 7 pin, miniature
75223	Socket—Tube socket, 9 pin, miniature
60942	Socket—Tube socket, 6 contact, steatite
31251	Socket—Tube socket, octal, wafer
71508	Socket—Tube socket, 6 contact, moulded for V113
74834	Socket—Kinescope socket
74936	Spring—Suspension spring for kinescope leads
76148	Spring—Compression spring for focus magnet adjustment
76149	Spring—Suspension spring for 2nd anode lead
74038	Spring—Tension spring for ground braid
76145	Strap—Kinescope retaining strap—upper
76636	Stud—Adjusting stud complete with guard for focus magnet
33491	Switch—"TV-Phono" switch (S103)
76010	Switch—AGC switch (S105)
75207	Transformer—Power transformer, 117 volt, 60 cycle (T109)
76139	Transformer—Vertical output transformer (T106)
74589	Transformer—First pix, i-f transformer (T101, C101, R101)
74590	Transformer—Second pix, i-f transformer (T102, C106)
76264	Transformer—Third pix, i-f transformer (T103, C113)
73574	Transformer—Fourth pix, i-f transformer (T104, C118)
71424	Transformer—Sound i-f transformer (T110, C114 C167)
75212	Transformer—Sound discriminator transformer (T111, C169, C170, C171)
75213	Transformer—Horizontal oscillator transformer (T107)
75509	Transformer—Antenna matching transformer complete with connector, i-f and F-M traps and antenna shunt coil (T200, C200, C201, C202, C203, J200, L200, L201, L202, L203)
76154	Tansformer—Hi-voltage transformer (T108)
71778	Trap—Sound trap (T105, C120)
75242	Trap—I-F trap (L200, L201, C200, C201)
75449	Trap—F-M trap complete with adjustable core and stud (L203, C203)
75251	Trap—4.5 mc trap (L105, C129)
75451	Tubing—Insulated tubing for kinescope strap (23")
76136	Yoke—Deflection yoke (L109, L110, L111, L112, C155, C180)
	SPEAKER ASSEMBLIES
	92585-2W
	RL-109-2W
	RMA-274
X3128	Cloth—Speaker grille cloth
5039	Plug—4 contact male plug (J101)
76156	Transformer—Output transformer (T112)
76155	Speaker—5" x 7" P.M. speaker (.76 oz. magnet) complete with cone and voice coil (3.2 ohms) less output transformer and plug
	MISCELLANEOUS
76157	Back—Cabinet back complete with power cord and terminal board
76184	Board—"Ant" terminal board—part of back
76124	Bracket—Safety glass retaining bracket—bottom
76123	Bracket—Safety glass retaining bracket—upper
76125	Clip—Decorative clip for bottom retaining bracket
39153	Connector—4 contact male connector for antenna cable
75474	Connector—Single contact male connector for antenna cable (2 req'd)
71457	Cord—Power cord and plug
76209	Decal—Control function decal
74809	Emblem—"RCA Victor" emblem
75499	Escutcheon—Channel marker escutcheon
76122	Glass—Safety glass
74959	Knob—Fine tuning control knob (outer)
74960	Knob—Channel selector knob (inner)
74962	Knob—Brightness control or vertical hold control knob (outer)
74969	Knob—Volume control and power switch knob
74963	Knob—Picture control or horizontal hold control (inner)
33225	Nut—Speed nut to fasten antenna in cabinet
72845	Spring—Retaining spring for Knob #74959
14270	Spring—Retaining spring for Knobs #74960, 74962, 74969
30330	Spring—Retaining spring for knob #74963
73643	Spring—Spring clip for channel marker escutcheon
75500	Washer—Felt washer for bock cover (3 req'd)

The system of employing an asterisk before the stock number of new items has been discontinued.

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS