RCA VICTOR

TELEVISION RECEIVERS

MODELS 8T270, 8TC270, 8TC271

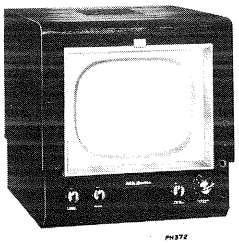
Chassis Nos. KCS29, KCS29A

Mfr. No. 274

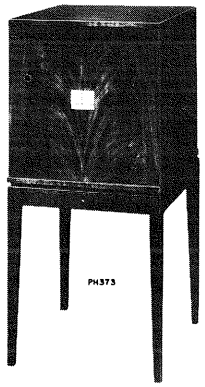
SERVICE DATA

—1949 No. T1—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.



Model 8T270 Walnut, Mahogany or Toasted Mahogany



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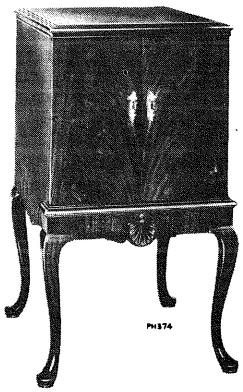


Model 8TC271 Walnut or Mahogany

GENERAL DESCRIPTION

Models 8T270. 8TC270 and 8TC271 are sixteen inch television receivers. These receivers employ twenty-two tubes plus four rectifiers and a 16AP4 kinescope. The receivers are identical except for cabinets.

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.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

PICTURE SIZE..... $10\frac{7}{32}$" x $13\frac{5}{8}$" — $3\frac{3}{16}$" radius at corner

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	81
3	60-66	61.25	65.75	87
4	66-72	67.25	71.75	93
5	76-82	77.25	81.75	103
6	82-88	83.25	87.75	109
7	174-180	175.25	179.75	201
8	180-186	181.25	185.75	207
9	186-192	187.25	191.75	213
10	192-198	193.25	197.75	219
11	198-204	199.25	203.75	225
12	204-210	205.25	209.75	231
13	210-216	211.25	215.75	237

FINE TUNING RANGE

Plus and minus approximately 250 kc on channel 2 and plus and minus approximately 650 kc on channel 13.

POWER SUPPLY RATING..... 115 volts, 60 cycles, 285 watts

AUDIO POWER OUTPUT RATING..... 2.4 watts max.

LOUDSPEAKER 92580-2..... 8 inch PM Dynamic
Voice Coil Impedance..... 3.2 ohms at 400 cycles

DIMENSIONS (inches)	Length	Height	Depth
Cabinet (outside) 8T270	22½	22½	23
Cabinet (outside) 8TC270	22½	48	24½
Cabinet (outside) 8TC271	24½	43¼	25
Chassis Assembly (outside)	19⅜	14¼	18¼
Chassis (Overall)	19⅜	14¼	22¾

RECEIVER ANTENNA INPUT IMPEDANCE

Choice: 300 ohms balanced or 72 ohms unbalanced.

WEIGHT

Chassis with Tubes in Cabinet—8T270..... 88 lbs.
8TC270..... 107 lbs. 8TC271..... 114 lbs.

Shipping Weight—8T270..... 109 lbs.
8TC270..... 143 lbs. 8TC271..... 145 lbs.

RCA TUBE COMPLEMENT

	Tube Used	Function
(1)	RCA 6AG5	R-F Amplifier
(2)	RCA 6J6	R-F Oscillator
(3)	RCA 6AG5	Converter
(4)	RCA 6AU6	1st Sound I-F Amplifier
(5)	RCA 6AU6	2nd Sound I-F Amplifier
(6)	RCA 6AL5	Sound Discriminator
(7)	RCA 6AV6	1st Audio Amplifier
(8)	RCA 6K6GT	Audio Output
(9)	RCA 6AG5	1st Picture I-F Amplifier
(10)	RCA 6AG5	2nd Picture I-F Amplifier
(11)	RCA 6AG5	3rd Picture I-F Amplifier
(12)	RCA 6AG5	4th Picture I-F Amplifier
(13)	RCA 6AL5	Picture 2nd Detector and Sync Limiter
(14)	RCA 6AU6	1st Video Amplifier
(15)	RCA 6K6GT	2nd Video Amplifier
(16)	RCA 6SN7GT	AGC Amplifier and Vertical Sweep Oscillator
(17)	RCA 6SN7GT	AGC Rectifier and 1st Sync Separator
(18)	RCA 6SN7GT	Sync Amplifier and 2nd Sync Separator
(19)	RCA 6K6GT	Vertical Sweep Output
(20)	RCA 6SN7GT	Horizontal Sweep Oscillator and Control
(21)	RCA 6BG6G	Horizontal Sweep Output
(22)	RCA 5V4G	Damper
(23)	RCA 1B3-GT/8016	H. V. Rectifier (2 tubes)
(24)	RCA 5U4G	Power Supply Rectifier (2 tubes)
(25)	RCA 16AP4	Kinescope

Specifications continued on page 2

8T270, 8TC270, 8TC271 ELECTRICAL AND MECHANICAL SPECIFICATIONS (Continued)

PICTURE I-F FREQUENCIES

Picture Carrier Frequency	25.75 Mc.
Adjacent Channel Sound Trap	27.25 Mc.
Accompanying Sound Traps	21.25 Mc.
Adjacent Channel Picture Carrier Trap	19.75 Mc.

SOUND I-F FREQUENCIES

Sound Carrier Frequency	21.25 Mc.
Sound Discriminator Band Width between peaks	350 kc

VIDEO RESPONSE ..... To 4 Mc.

FOCUS ..... Magnetic

SWEEP DEFLECTION ..... Magnetic

SCANNING ..... Interlaced, 525 line

HORIZONTAL SCANNING FREQUENCY ..... 15,750 cps

VERTICAL SCANNING FREQUENCY ..... 60 cps

FRAME FREQUENCY (Picture Repetition Rate) ..... 30 cps

OPERATING CONTROLS (front panel)

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

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

Horizontal Centering	rear chassis adjustment
Vertical Centering	rear chassis adjustment
Width	rear chassis screwdriver adjustments
Height	rear chassis adjustment
Horizontal Linearity	rear chassis screwdriver adjustment
Vertical Linearity	rear chassis adjustment
Horizontal Drive	rear chassis screwdriver adjustment
Horizontal Oscillator Frequency	bottom chassis adjustment
Horizontal Oscillator Waveform	side chassis adjustment
Focus	rear chassis adjustment
Ion Trap Magnet	top chassis adjustment
Deflection Coil	top chassis wing nut adjustment
Focus Coil	top chassis screwdriver adjustment
Video Bias	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 TELEVISION RECEIVER WITH THE HIGH VOLTAGE COMPARTMENT SHIELD REMOVED.

KINESCOPE HANDLING PRECAUTIONS

DO NOT OPEN THE KINESCOPE SHIPPING CARTON, 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 these reasons, kinescopes must be handled with more care than ordinary receiving tubes.

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

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

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

2. Set the STATION SELECTOR to the desired channel.

3. Adjust the FINE TUNING control for best sound fidelity and SOUND VOLUME for suitable volume.

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

5. Adjust the VERTICAL hold control until the pattern stops vertical movement.

6. Adjust the HORIZONTAL hold control until a picture is obtained and centered.

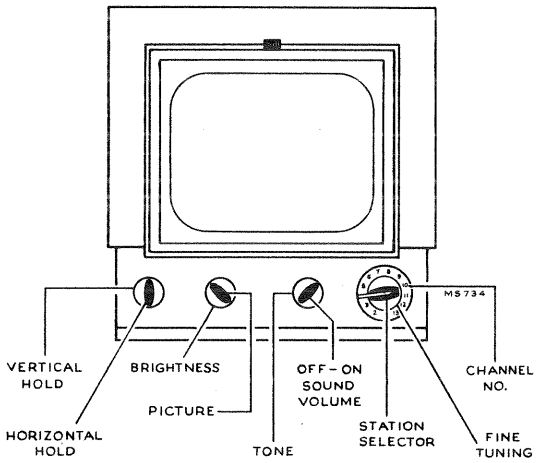


Figure 1—Receiver Operating Controls

7. Turn the BRIGHTNESS control counterclockwise until the retrace lines just disappear.

8. Adjust the PICTURE control for suitable picture contrast.

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 station to another, it may be necessary to repeat steps numbers 3 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 3 is generally sufficient.

12. If the positions of the controls have been changed, it may be necessary to repeat steps numbers 1 through 8.

INSTALLATION INSTRUCTIONS

The Model 8T270, 8TC270 and 8TC271 television receivers are shipped complete in one carton except for the 16AP4 kinescope. The kinescope is shipped in a special carton and should not be unpacked until ready for installation.

UNPACKING. — Model 8T270 is shipped in a cardboard carton. To open the carton tear open the carton top flaps, remove the cardboard side packing material and with a man on two sides of the cabinet, lift it out of the carton.

Models 8TC270 and 8TC271 are also shipped in cardboard cartons. To unpack, turn the shipping carton on its side and tear open the carton bottom flaps. Fold the flaps up along the side of the carton and turn the carton back up. Lift the carton up and off the cabinet.

Remove the cabinet back grille. Remove all shipping material. Remove the envelope containing the control knobs and ion trap magnet. Make sure all tubes are in place and are firmly seated in their sockets.

Remove the cabinet front panel by loosening two wingnuts inside the cabinet and turning the two locking plates to the vertical position as shown in Figure 2. In Models 8TC270 and 8TC271, the panel may then be removed by hingeing the panel at the bottom and pulling out on the top edge. In Model 8T270, it will be necessary to remove two screws under the bottom of the cabinet.

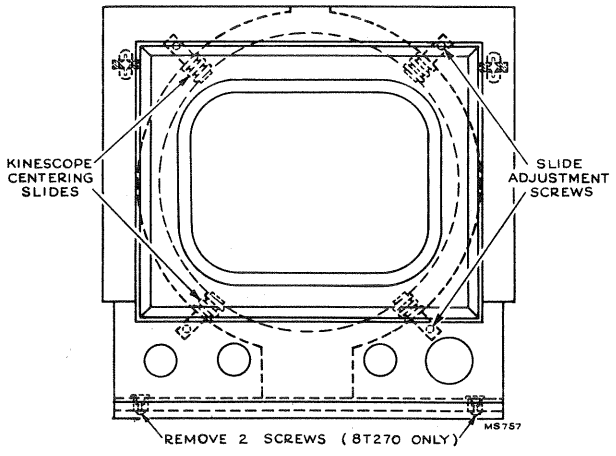


Figure 2—Cabinet, Front View

REMOVE THE TWO SELF-TAPPING SCREWS FROM THE KINESCOPE CUSHION SLIDE AS SHOWN IN FIGURE 3.

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

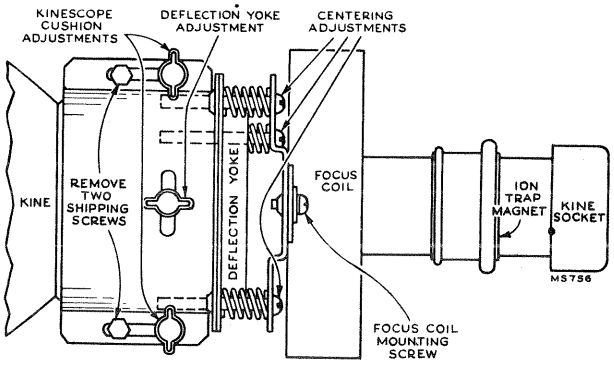


Figure 3—Yoke and Focus Coil Adjustments

From the front of the cabinet, look through the deflection yoke and check the alignment of the focus coil with the yoke. If the focus coil is not in line, loosen the two focus coil mounting screws and move the coil until alignment is obtained. Tighten the mounting screws with the coil in this position.

Loosen the two lower kinescope face centering slides, and set them at approximately mid-position. See Figure 2 for location of the slides and their adjustment screws. Loosen the two upper slides (from inside the cabinet), slip them up as far as possible and tighten.

Check the centering slides. There should be a small wire clip on the inner surface of each. The clip in the lower left corner should be connected to the high voltage lead.

KINESCOPE HANDLING PRECAUTION. — Do not open the kinescope shipping carton, install, remove, or handle the kinescope in any manner, unless shatter-proof goggles and heavy gloves are worn. Persons not so equipped should be kept away while handling the kinescope. Keep the kinescope away from the body while handling. The shipping carton should be kept for use in case of future moves.

Handle this tube by the metal rim at the edge of the screen. Do not cover the glass bell of the tube with fingermarks as it will produce leakage paths which may interfere with reception. If this portion of the tube has inadvertently been handled, wipe it clean with a soft cloth moistened with "dry" carbon tetrachloride.

KINESCOPE INSTALLATION. — Slip the Vinylite boot over the metal cone of the kinescope, turn the tube so that the key on the base of the tube will be down and insert the neck of the kinescope through the deflection and focus coils as shown in Figure 4. If the tube sticks, or fails to slip into place smoothly, investigate and remove the cause of the trouble. Do not force the tube.

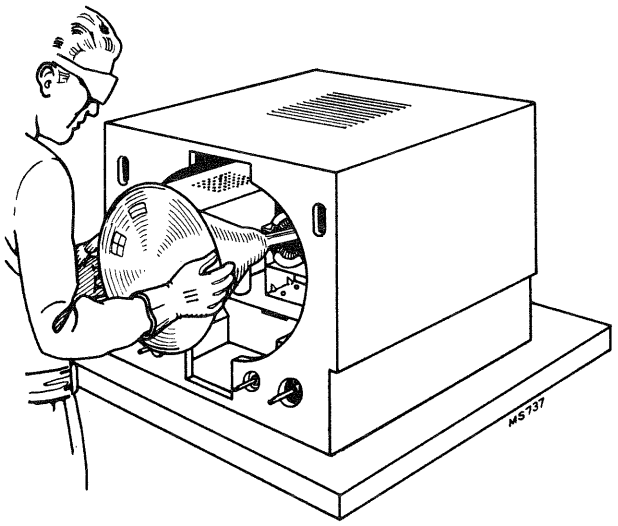


Figure 4—Kinescope Insertion

Slip the ion trap magnet assembly over the neck of the kinescope with the large magnet towards the base of the tube.

Connect the kinescope socket to the tube base.

Adjust the four centering slides until the face of the kinescope is in the center of the cabinet opening. Tighten the four slides securely.

Wipe the kinescope screen surface and front panel safety glass clean of all dust and finger marks with a soft cloth moistened with the Drackett Co. s "Windex" or similar cleaning agent.

Install the cabinet front panel by reversal of the procedure indicated in Figure 2.

For Models 8TC270 and 8TC271 to install the front panel, place the lip on the bottom of the panel in the recess below the kinescope opening and push the top in. Fasten the two bars in back of the panel and tighten the wingnuts.

Slip the kinescope as far forward as possible. Slide the kinescope cushion firmly up against the flare of the tube and tighten the adjustment wing screws. Slide the deflection yoke as far forward as possible. If this is not done, difficulty will be encountered in adjusting the ion trap magnet and focus coil because of shadows on the corner of the raster.

The antenna and power connections should now be made. Install the front panel control knobs.

WARNING. — The high voltage supply in this receiver delivers 12,000 volts! If it is necessary to remove the kinescope after the receiver has been operating, short the kinescope cone to the chassis before attempting removal of or adjustments to the kinescope. A.C. interlocks are provided at the back of the set so that when the back is removed — so is the power.

Turn the power switch to the "on" position, the brightness control fully clockwise, and picture control counterclockwise.

ION TRAP MAGNET ADJUSTMENT. — Looking at the kinescope gun structure, it will be observed that the second cylinder from the base inside the glass neck is provided with two small metal flags, as shown in Figure 5.

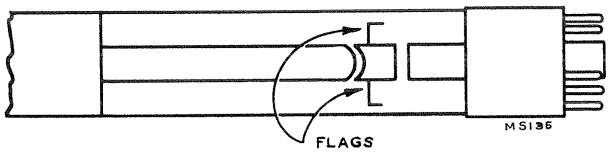


Figure 5—Ion Trap Flags

The ion trap rear magnet poles should be approximately over the ion trap flags. Starting from this position 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. Adjust the focus control (R201 on the chassis rear apron) until the line structure of the raster is clearly visible. Readjust the ion trap magnet for maximum raster brilliance. The final touches on this adjustment should be made with the brightness control at the maximum position with which good line focus can be maintained.

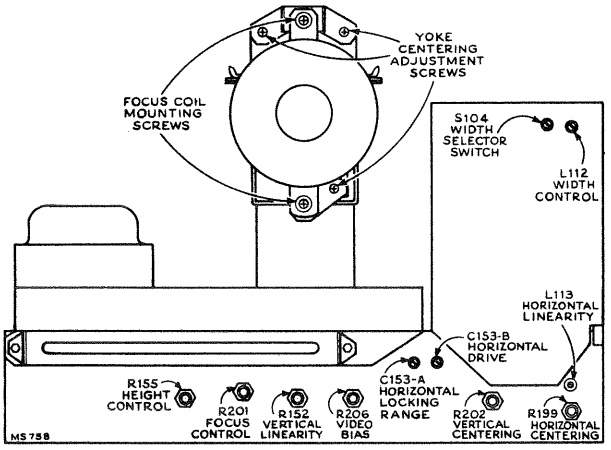


Figure 6—Rear Chassis Adjustments

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. See steps 2 through 8 of the receiver operating instructions on page 3.

If the Horizontal Oscillator is operating properly, it should be possible to sync the picture at this point.

CHECK OF HORIZONTAL OSCILLATOR ALIGNMENT. — Turn the horizontal hold control to the extreme counterclockwise 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 3 bars sloping downward to the

left are obtained, the picture will pull into sync upon slight additional clockwise rotation of the control. Pull in should occur when the control is approximately 90 degrees from the extreme counterclockwise position. The picture should remain in sync for approximately 90 degrees of additional clockwise rotation of the control. At the extreme clockwise position, the picture should be out of sync and should show 1 vertical or diagonal black bar in the raster.

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

ALIGNMENT OF HORIZONTAL OSCILLATOR. — If in the above check the receiver failed to hold sync with the hold control at the extreme counterclockwise position or failed to hold sync over 90 degrees of clockwise rotation of the contro. 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 T109 horizontal frequency adjustment (under 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 Lock in Range Adjustment. — Set the horizontal hold control to the full counterclockwise 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 3 bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C153A slightly clockwise. If less than 3 bars are present, adjust C153A slightly counterclockwise. Turn the picture control counterclockwise, momentarily remove the signal and recheck the number of bars present at the pull in point. Repeat this procedure until 3 bars are present.

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

If it is impossible to sync the picture at this point and the AGC system is operating properly 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 Oscillator Waveform Adjustment may be omitted.

CENTERING ADJUSTMENTS. — Centering is obtained by adjustment of the centering controls and by mechanically orienting the focus coil with three adjustment screws shown in Figure 3. The focus coil should be concentric around the neck of the kinescope to prevent curvature of the raster.

Adjust the focus coil until it is at right angles to the neck of the kinescope. Center the picture with the electrical centering controls. If a shadow appears on a corner of the picture, adjust the focus coil centering screws to eliminate the shadow and re-center the picture with the electrical centering controls.

FOCUS COIL ADJUSTMENTS. — If, after making the centering adjustments in the above paragraph, a corner of the picture is shadowed, it will be necessary to loosen the focus coil mounting screws (shown in Figure 3) and change the position of the coil to eliminate the shadow. Re-center the picture by adjustment of the electrical centering controls and the focus coil centering adjustments.

Recheck the position of the ion trap magnet to insure that maximum brilliance is obtained.

HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS. — Adjust the height control (R155 on chassis rear apron) until the picture fills the mask vertically. Adjust vertical linearity (R162 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 vertical centering to align the picture with the mask.

WIDTH, DRIVE AND HORIZONTAL LINEARITY ADJUSTMENTS. — Adjust the horizontal drive control C153B to give a picture of maximum width within the limits of good linearity. Adjust the horizontal linearity control L113 to provide best linearity.

A width control coil and a width selector switch are provided. With the switch in position 1 (fully counterclockwise), adjust the width coil until the picture fills the mask. On low line voltages it may not be possible to get sufficient width by adjustment of the width coil. In this case turn the width selector switch clockwise to position 2. In this position the width coil is disconnected, and adjustment of the width coil will have no effect. For still greater width, turn the width selector switch fully clockwise to position 3. In this position, the 6BG6G screen voltage is increased as well as disconnecting the width control coil.

Adjustments of the horizontal drive control affect horizontal oscillator hold and locking range. If the drive control was adjusted, recheck the oscillator alignment.

FOCUS. — Adjust the focus control (R201 on chassis rear apron) for maximum definition in the test pattern vertical "wedge" and best focus in the white areas of the pattern.

CHECK TO SEE THAT THE CUSHION AND YOKE THUMBSCREWS AND THE FOCUS COIL MOUNTING SCREWS ARE TIGHT.

VIDEO BIAS CONTROL. — Normally the video bias control (R206) should be in the fully clockwise position. To check to see if this is the correct position, turn the picture control clockwise and adjust the brightness control until the retrace lines just disappear. If the whites are compressed as indicated by a "washed out" appearance in light areas, turn the video bias control counterclockwise until the picture appears normal.

Replace the cabinet back and make sure that the screws holding it are up tight, otherwise it may rattle or buzz when the receiver is operated at high volume.

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 5 and 7 through 12 are available from the front of the cabinet by removing the station selector escutcheon as shown in Figure 7. Adjustment for channel 13 is on top of the chassis and channel 6 adjustment is in the kinescope well. See Figures 11 and 12 for their location.

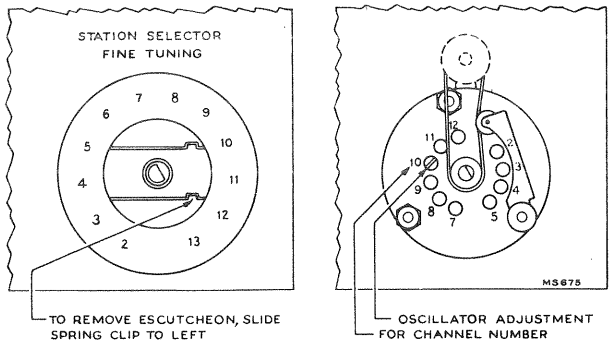


Figure 7—R-F Oscillator Adjustments

CAUTION. — The ion trap magnet employed for 16AP4 kinescopes is not the same as that used on 10BP4 tubes. Care should be taken to insure that the proper magnet supplied with the instrument is used. The type magnet shown in Figure 3 measures three fourths of an inch between magnet center lines and carries the number 986432-1 stamped on it.

8T270, 8TC270, 8TC271

CHASSIS TOP VIEW

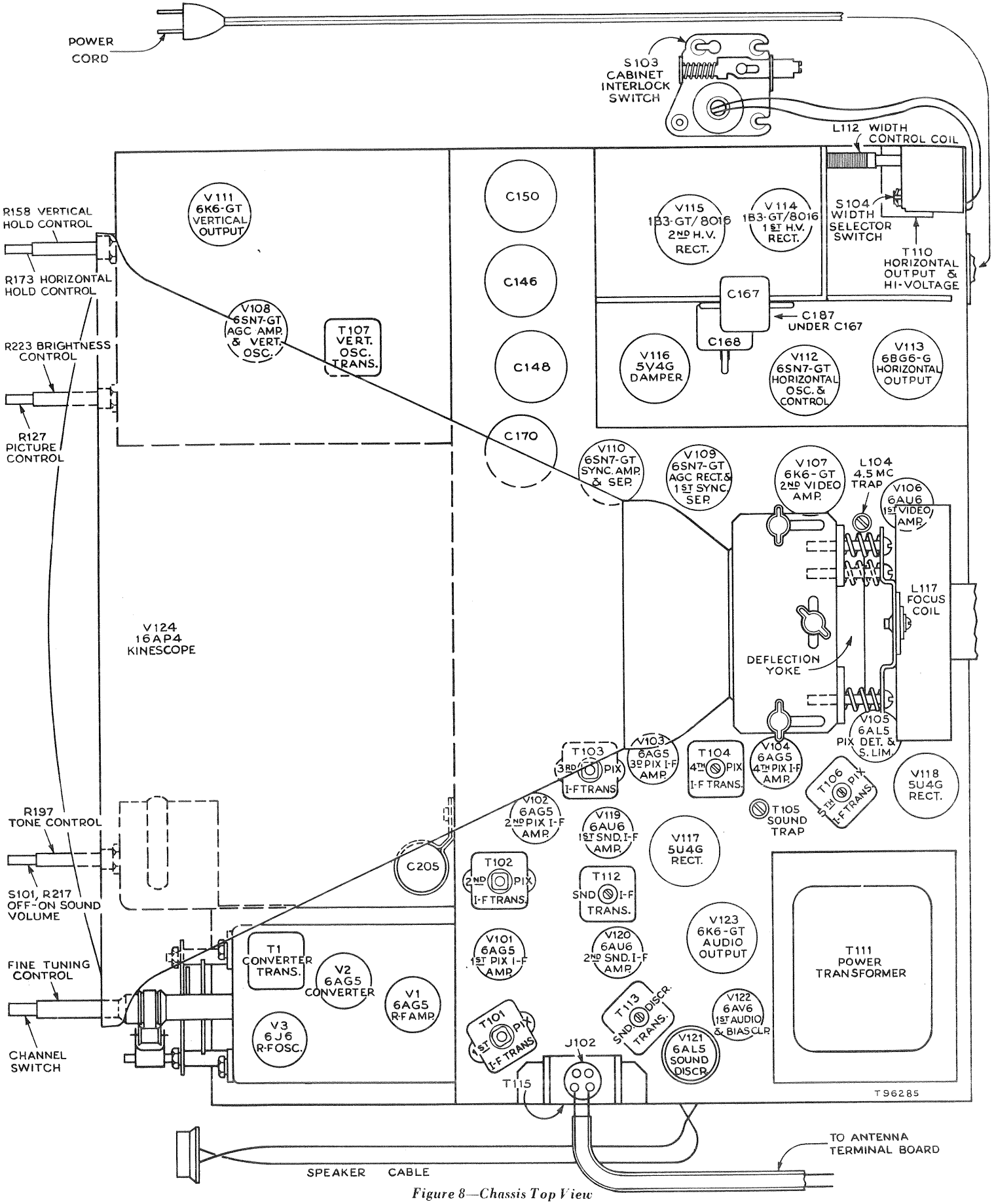


Figure 8—Chassis Top View

CHASSIS BOTTOM VIEW

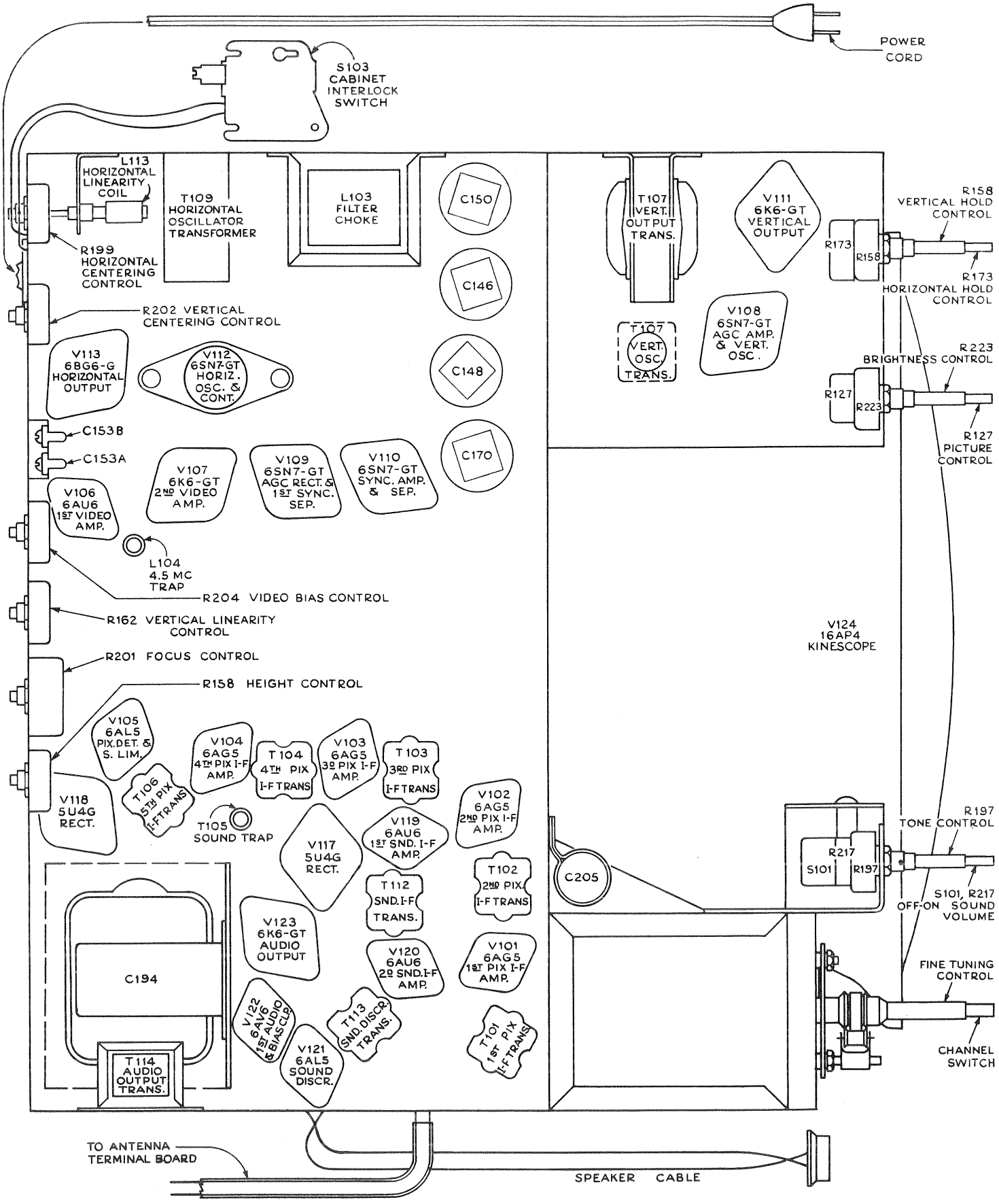


Figure 9—Chassis Bottom View

8T270, 8TC270, 8TC271

VOLTAGE CHART

The following measurements represent two sets of conditions. In the first condition a 2200 microvolt test pattern signal was fed into the receiver, the picture synced and the AGC threshold control properly adjusted. The second condition was obtained by removing the antenna leads and short circuiting the receiver antenna terminals. Voltages shown are as read with "Jr. VoltOhymst" between the indicated terminal and chassis ground and with the receiver operating on 117 volts 60 cycles a-c.

Tube No.	Tube Type	Function	Operating Condition	E. Plate		E. Screen		E. Cathode		E. Grid		I Plate (ma.)	I Screen (ma.)	Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts			
V1	6AG5	R-F Amplifier	2200 Mu. V. Signal	5	140	6	142	2 & 7	0	1	−4.9	.7	3	
			No Signal	5	67	6	111	2 & 7	0	1	−0.3	14.0	5.0	
V2	6AG5	Converter	2200 Mu. V. Signal	5	137	6	137	2 & 7	0	1	*−5.4	—	—	*Depending upon channel
			No Signal	5	108	6	108	2 & 7	0	1	*−2.0 to −7.0	*6.0 to 10	*1.5 to 3.0	
V3	6J6	R-F Oscillator	2200 Mu. V. Signal	1 & 2	90.5	—	—	7	.19	5 & 6	*−7.0	—	—	*Depending upon channel
			No Signal	1 & 2	*68 to 81	—	—	7	.16	5 & 6	*−4.5 to −6.6	*1.8 to 2.1	—	
V101	6AG5	1st Pix. I-F Amplifier	2200 Mu. V. Signal	5	136	6	136	2 & 7	<0.1	1	−4.2	0.5	0.1	
			No Signal	5	110	6	103	2 & 7	0.17	1	−1.5	3.8	0.6	
V102	6AG5	2d Pix. I-F Amplifier	2200 Mu. V. Signal	5	122	6	122	2 & 7	0.9	1	0	10.3	2.9	
			No Signal	5	96	6	100	2 & 7	0.6	1	0	6.8	2.0	
V103	6AG5	3d Pix. I-F Amplifier	2200 Mu. V. Signal	5	130	6	137	2 & 7	<0.1	1	−4.2	1.0	.3	
			No Signal	5	95	6	106	2 & 7	0.17	1	−1.5	3.6	.8	
V104	6AG5	4th Pix. I-F Amplifier	2200 Mu. V. Signal	5	194	6	137	2 & 7	1.6	1	0	8.3	2.7	
			No Signal	5	200	6	113	2 & 7	1.2	1	0	7.1	1.4	
V105 A	6AL5	Picture 2d Det.	2200 Mu. V. Signal	7	−117	—	—	1	−115	—	—	0.2	—	
			No Signal	7	−130	—	—	1	−125	—	—	0.3	—	
V105 B	6AL5	Sync Limiter	2200 Mu. V. Signal	2	−131	—	—	5	−46	—	—	<0.1	—	
			No Signal	2	−100	—	—	5	−52	—	—	<0.1	—	
V106	6AU6	1st Video Amplifier	2200 Mu. V. Signal	5	−68	6	27	7	−114.5	1	−117	3.9	1.8	
			No Signal	5	−72	6	25	7	−124	1	−130	3.7	1.6	
V107	6K6 GT	2d Video Amplifier	2200 Mu. V. Signal	3	*68	4	140	8	−47	5	−68	10.0	2.5	Maximum contrast
			No Signal	3	*34	4	120	8	−52	5	−72	11.0	2.3	
V108 A	6SN7 GT	AGC Amplifier	2200 Mu. V. Signal	5	−24	—	—	6	−50	4	−51	0.4	—	
			No Signal	5	−7	—	—	6	−56	4	−60	<0.1	—	
V108 B	6SN7 GT	Vertical Oscillator	2200 Mu. V. Signal	2	54	—	—	3	−110	1	−157	0.32	—	
			No Signal	2	39	—	—	3	−125	1	−171	0.32	—	
V109	6SN7 GT	AGC Rectifier	2200 Mu. V. Signal	5	27	—	—	6	−51	4	−68	0.25	—	
			No Signal	5	19	—	—	6	−59	4	−72	0.25	—	
V109	6SN7 GT	1st Sync Separator	2200 Mu. V. Signal	2	23	—	—	3	−52	1	−68	0.13	—	
			No Signal	2	18	—	—	3	−63	1	−70	0.18	—	

VOLTAGE CHART

Tube No.	Tube Type	Function	Operating Condition	E. Plate		E. Screen		E. Cathode		E. Grid		I Plate (ma.)	I Screen (ma.)	Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts			
V110	6SN7 GT	Sync Amplifier	2200 Mu. V. Signal	2	81	—	—	3	−46	1	−48	10.8	—	
			No Signal	2	71	—	—	3	−50	1	−54	10.8	—	
V110	6SN7 GT	Sync Separator	2200 Mu. V. Signal	5	210	—	—	6	−44	4	−131	0.34	—	
			No Signal	5	200	—	—	6	−51	4	−100	0.15	—	
V111	6K6-GT	Vertical Output	2200 Mu. V. Signal	3	197	4	*197	8	−76	5	−96	7.7	1.3	*Screen connected to plate
			No Signal	3	185	4	*185	8	−93	5	−110	7.6	1.3	
V112	6SN7 GT	Horizontal Osc. Control	2200 Mu. V. Signal	2	25	—	—	3	−120	1	−110	0.24	—	Horizontal hold control completely clockwise
			No Signal	2	−8	—	—	3	−146	1	−128	0.1	—	
			No Signal	2	+60	—	—	3	−130	1	−114	0.13	—	Hold control counterclockwise
V112	6SN7 GT	Horizontal Oscillator	2200 Mu. V. Signal	5	75	—	—	6	−115	4	−190	2.3	—	
			No Signal	5	60	—	—	6	−125	4	−204	1.5	—	
V113	6BG6G	Horizontal Output	2200 Mu. V. Signal	Cap	*	8	180	3	−100	5	−120	90.0	10.0	*5200 volt pulse present
			No Signal	Cap	Do Not Meas.	8	160	3	−112	5	−126	92.6	10.4	
V114	1B3GT /8016	H. V. Rectifier	Brightness Min.	Cap	*	—	—	2 & 7	6400	—	—	—	—	*6000 volt pulse present
			Brightness Max.	Cap	Do Not Meas.	—	—	2 & 7	6100	—	—	—	—	
V115	1B3GT /8016	H. V. Rectifier	Brightness Min.	Cap	*	—	—	2 & 7	11700	—	—	—	—	*6000 volt pulse present
			Brightness Max.	Cap	Do Not Meas.	—	—	2 & 7	11600	—	—	—	—	
V116	5V4G	Damper	2200 Mu. V. Signal	4 & 6	*	—	—	2 & 8	350	—	—	93.0	—	*1200 volt pulse present
			No Signal	4 & 6	Do Not Meas.	—	—	2 & 8	340	—	—	92.0	—	
V117 V118	5U4G	Rectifier	2200 Mu. V. Signal	4 & 6	*365	—	—	2 & 8	277	—	—	†125	—	†Per tube *A-C measured from plate to trans. center tap
			No Signal	4 & 6	*365	—	—	2 & 8	264	—	—	†130	—	
V119	6AU6	1st Sound I-F Amplifier	2200 Mu. V. Signal	5	131	6	131	7	0.65	1	0	6.0		
			No Signal	5	106	6	106	7	0.55	1	0	4.9		
V120	6AU6	2d Sound I-F Amplifier	2200 Mu. V. Signal	5	136	6	80	7	0	1	−0.6	3.5		
			No Signal	5	111	6	62	7	0	1	−0.7	3.0		
V121	6AL5	Sound Discrim.	2200 Mu. V. Signal	2	−1.4	—	—	5	0	—	—	—	—	
			No Signal	2	−0.7	—	—	5	0	—	—	—	—	
V122	6AV6	1st Audio Amplifier	2200 Mu. V. Signal	7	88	—	—	2	0	1	−0.7	0.5	—	
			No Signal	7	91	—	—	2	0	1	−0.7	0.5	—	
V123	6K6-GT	Audio Output	2200 Mu. V. Signal	3	152	4	165	8	−94	5	−115	24.0	3.4	
			No Signal	3	139	4	152	8	−107	5	−125	24.0	3.4	
V124	16AP4	Kinescope	2200 Mu. V. Signal	Cap	11700	10	320	11	26	2	−29	0.08	—	Average Brightness
			No Signal	Cap	11600	10	305	11	11	2	−47	0.08	—	Average Brightness

8T270, 8TC270, 8TC271 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., 10 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, preferably one with a wide band vertical deflection, an input calibrating source, and a low capacity probe.

Signal Generator to provide the following frequencies.

(a) I-F frequencies
19.75 mc. adjacent channel picture trap
21.25 mc. sound i-f and sound traps
22.05 and 24.75 mc. converter and first pix i-f transformer
25.9 mc. second picture i-f transformer
24.6 mc. fourth picture i-f transformer
22.0 mc. third picture i-f transformer
22.5 mc. fifth picture i-f transformer
25.75 mc. picture carrier
27.25 mc. adjacent channel sound trap

(b) R-F 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 on 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 necessary to remove the chassis from cabinet, the kinescope must first be removed. See Figures 2 and 4. If possible, the chassis should then be serviced without the kinescope. However, if it is necessary to view the raster during servicing, the kinescope should be inserted only after the chassis is turned on end. The kinescope should never be allowed to support its weight by resting in the deflecting yoke. A bracket should be used to support the tube at its viewing screen.

By turning the chassis on end with the power transformer down, all adjustments will be made conveniently available. Since this is the only safe position in which the chassis will rest and still leave all adjustments accessible, the trimmer location drawings are oriented similarly for ease of use.

CAUTION: Do not short the kinescope second anode lead.

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

The oscillator line is relatively non critical. When oscillator tubes are changed, in all probability it will be necessary to adjust only C6 in order to bring the entire line into adjustment.

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 and converter lines
(6) R-F oscillator line
(7) 4.5 mc. video trap
(8) Sensitivity check

SOUND DISCRIMINATOR ALIGNMENT. — Set the signal generator for approximately .1 volt output at 21.25 mc. and connect it to the second sound i-f grid.

Detune T113 secondary (bottom).

Set the "VoltOhmyst" on the 10 volt scale.

Connect the meter in series with a one megohm resistor to the junction of diode resistors R215 and R216.

Adjust the primary of T113 (top) for maximum output on the meter.

Connect the "VoltOhmyst" to the junction of C183 and R215. Adjust T113 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. T113 (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.

Adjust the sweep band width to approximately 1 mc. with the center frequency at approximately 21.25 mc. and with an output of approximately .1 volt.

Connect the oscilloscope to the junction of C183 and R215. The pattern obtained should be similar to that shown in Figure 15. If it is not, adjust the T113 (top) until the wave form is symmetrical.

The peak to peak band width of the discriminator should be approximately 350 kc. and it should be linear from 21.175 mc. to 21.325 mc.

SOUND I-F ALIGNMENT. — Connect the sweep oscillator to the first sound i-f amplifier grid.

Connect the oscilloscope to the second sound i-f grid return (terminal "A" of T112) in series with a 33,000 ohm isolating resistor.

Insert a 21.25 mc. marker signal from the signal generator into the first sound i-f grid.

Adjust T112 (top and bottom) for maximum gain and symmetry about the 21.25 mc. marker. The pattern obtained should be similar to that shown in Figure 16.

The output level from the sweep should be set to produce approximately .3 volt peak-to-peak at the second sound i-f grid return 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 "VoltOhmyst" to the junction of R135 and R136.

Remove the 6SN7GT AGC Amplifier tube V108. Connect a 250,000 ohm potentiometer between pins 5 and 6 of the V108 socket. Adjust the potentiometer until the "VoltOhmyst" reads approximately −4.5 volts.

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

Connect the "VoltOhmyst" across the picture detector load resistor R120. Under this condition, both leads of the meter are at approximately −125 volts. In making this measurement, care should be taken not to touch the case of the meter or to permit the meter case to become grounded.

Connect the output of the signal generator to the grid of the converter tube V2. To do this, remove the tube from the socket and fashion a clip by twisting one end of a small piece of wire around pin number 1. Replace the tube in the socket leaving the end of the wire protruding from under the tube. Connect the signal generator to this wire through a 1,500 mmf capacitor keeping the leads as short as possible.

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) 21.25 mc.—T103 (top)
(2) 21.25 mc.—T105 (top)
(3) 27.25 mc.—T102 (top)
(4) 27.25 mc.—T104 (top)
(5) 19.75 mc.—T106 (top)
(6) 19.75 mc.—T101 (top)

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

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

22.5 mc.—T106 (bottom)
24.6 mc.—T104 (bottom)
22.0 mc.—T103 (bottom)
25.9 mc.—T102 (bottom)

T1 and T101 are coupled by a link and in combination constitute an overcoupled transformer. The characteristics of such a transformer are such that it is impossible to adjust it to a single frequency.

To sweep align T1 and T101, connect a 330 ohm composition resistor across the primary coils of T102, T103, T104 and T106.

Connect the "VoltOhmyst" to the junction of R135 and R136. Adjust the 250,000 ohm potentiometer for −2.0 volts on the meter.

Connect the oscilloscope to the plate of the first video amplifier pin 5 of V106.

Connect a sweep generator to the converter grid through a 1,500 mmf capacitor. Set the generator to sweep from 20.0 mc. to 30.0 mc. and adjust the output to provide a 4 volt peak-to-peak signal on the scope.

Connect the signal generator loosely to the converter grid and adjust to provide markers at 22.05 mc. and 24.75 mc.

Adjust T1 (top) and T101 (bottom) to obtain the response shown in Figure 17. The T1 core must penetrate to the terminal board end of the coil in order to obtain the correct response.

Remove the 330 ohm resistors from across T102, T103, T104 and T106.

Adjust the 250,000 ohm potentiometer for a 15 volt peak-to-peak signal at the plate of the first video amplifier. The bias as measured by the "VoltOhmyst" should be −4.5 volts or less.

Observe and analyze the response curve obtained. The response will not be ideal and the i-f adjustments must be retouched in order to obtain the desired curve. See Figure 18.

On final adjustment the picture carrier marker must be at approximately 45% response. The curve must be approximately flat topped, with the 22.1 mc. marker at approximately 95% response, the 25.0 mc. marker below 90% and the 26.5 mc. marker between 5% and 10% on the response curve.

The most important consideration in making the i-f adjustments is to get the picture carrier at the 45% response point. If the picture carrier operates too low on the response curve, loss of low frequency video response, of picture brilliance, of blanking, and of sync may occur. If the picture carrier operates too high on the response curve, the picture becomes smeared. In making these adjustments, care should be taken that no two transformers are tuned to the same frequency as i-f oscillation may result.

Remove the converter tube and take off the clip to pin number 1. Replace the tube in the socket.

Picture I-F Oscillation. — If the receiver will operate without oscillating with the test equipment disconnected but breaks into oscillation or becomes unstable with the equipment connected, it may become necessary to establish a ground plane. Cover the test bench with a sheet of copper and set the chassis on the sheet. Set all the test equipment except the "VoltOhmyst" on the sheet and bond or bypass them to it. A Junior "VoltOhmyst" should not be bonded to the sheet since the negative test probe is not always connected to ground during alignment.

If the receiver is badly misaligned and two or more of the i-f transformers are tuned to the same frequency, the receiver may fall into i-f oscillation. I-F oscillation shows up as a voltage across the picture detector load resistor that is unaffected by r-f signal input. If such a condition is encountered, it is sometimes possible to stop oscillation by adjusting the transformers approximately to frequency by setting the adjustment cores of T101, T102, T103, T104, T105 and T106 to be approximately equal to those of another receiver known to be in proper alignment. If this does not have the desired effect, it may now be possible to stop oscillation by increasing the grid bias. If so, it should then be possible to align the transformers by the usual method. Once aligned in this manner, the i-f should be stable with reduced bias.

If the oscillation cannot be stopped in the above manner, shunt the grids of the first three pix i-f amplifiers to ground with 1,000 mmf. capacitors. Connect the signal generator to the fourth pix i-f grid and align T106 to frequency. Progressively remove the shunt from each grid and align the plate coil of that stage to frequency.

If this does not stop the oscillation, the difficulty is not due to i-f misalignment as the i-f section is stable when properly aligned. Check all i-f by-pass condensers, transformer shunting resistors, tubes, socket voltages, etc.

ANTENNA, R-F AND CONVERTER LINE ADJUSTMENT. — 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 channel 13 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 C183 and R215).

Set the receiver channel switch to 13.

Adjust the frequency standard to the correct frequency (237 mc. for heterodyne frequency meter or 215.75 mc. for the signal generator).

Set the fine tuning control to the middle of its range while making the adjustment.

Adjust C6 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 procede with the r-f alignment.

Connect the oscilloscope to the test connection at R13 in the r-f tuning unit.

Connect the "VoltOhmyst" to the junction of R133 and R134. Adjust the bias potentiometer for −3.5 volts on the meter.

Remove the first picture i-f amplifier tube V101.

Connect the r-f sweep oscillator to the receiver antenna terminals. The method of connection depends upon the output impedance of the sweep. The P102 connection for 300 ohm balanced or 72 ohm single-ended input are shown in the circuit diagram in Figure 80. If the sweep oscillator has a 50-ohm single-ended output, 300 ohm balanced output can be obtained by connecting as shown in Figure 10.

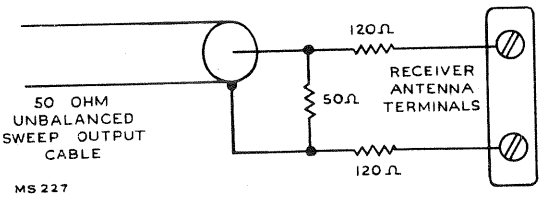


Figure 10—Unbalanced Sweep Cable Termination

Connect the signal generator loosely to the receiver antenna terminals.

Since channel 7 has the narrowest response of any of the high frequency channels, it should be adjusted first.

Set the receiver channel switch to channel 7.

Set the sweep oscillator to cover channel 7.

Insert markers of channel 7 picture carrier and sound carrier 175.25 mc. and 179.75 mc.

Adjust C10 and C14 until the curve falls symmetrically with the sound and picture carrier markers. Adjust C11 to give the proper bandwidth. Roughly peak L6 in conjunction with slight adjustments of C10 and C14 for a flat-topped, response curve with the sound and picture carriers at 90% to 95% response points on this curve. See Figure 19, channel 7.

Switch to channel 12 and adjust L6 for maximum response and minimum top slope of the curve.

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 observe the response obtained. See Figure 19 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 on one or more high frequency channels, since there are no individual channel adjustments, it will be necessary to readjust L6, C10, C11 and C14, and possibly compromise some channels slightly in order to get the markers up on other channels. Normally, however, no difficulty of this type should be experienced since the higher frequency channels become comparatively broad and the markers easily fall within the required range.

Channel 6 is next aligned in the same manner.

Set the receiver to channel 6.

Set the sweep oscillator to cover channel 6.

Set the marker oscillator to channel 6 picture and sound carrier frequencies.

Adjust L9, L13, L66 and C12 for an approximately flat-topped response curve located symmetrically between the markers. L9, L13 and L66 are the center frequency adjustments. C12 is the band width adjustment.

Check channels 5 down through channel 2 by switching the receiver, sweep oscillator and marker oscillator to each channel and observing the response obtained. In all cases, the markers should be above the 80% response point. If this is not the case, L9, L13, L66 and C12 should be retouched. On final adjustment, all channels must be within the 80% specification.

Disconnect the bias potentiometer and replace V108. Replace V101.

Following an r-f alignment, the oscillator alignment must be checked.

R-F OSCILLATOR LINE ADJUSTMENT. — The r-f oscillator line 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, the calibration frequency listed under R-F Osc. Freq. must be available.

If the receiver oscillator is adjusted by feeding in the r-f sound carrier frequency, the frequencies listed under Sound Carrier Freq. must be available.

Channel Number	Receiver R-F Osc. Freq. Mc.	R-F Sound Carrier Freq. Mc.	Channel Oscillator Adjustment
2	81	59.75	L24
3	87	65.75	L23
4	93	71.75	L22
5	103	81.75	L21
6	109	87.75	L31
7	201	179.75	L19
8	207	185.75	L18
9	213	191.75	L17
10	219	197.75	L16
11	225	203.75	L15
12	231	209.75	L14
13	237	215.75	C6

If the heterodyne frequency meter method is used, couple the meter probe loosely to the receiver oscillator.

If the r-f sound carrier method is used, connect the "VoltOhmyst" to the sound discriminator output (junction of C183 and R215).

Connect the signal generator to the receiver antenna terminals. The order of alignment remains the same regardless of which method is used.

The shield over the bottom of the r-f unit must be in place when making adjustments.

Since lower frequencies are obtained by adding steps of inductance, it is necessary to align channel 13 first and continue in reverse numerical order.

Set the receiver channel switch to 13.

Adjust the frequency standard to the correct frequency (237 mc. for heterodyne frequency meter or 215.75 mc. for the signal generator).

Set the fine tuning control to the middle of its range while making the adjustment.

Adjust C6 for an audible beat on the heterodyne frequency meter or zero voltage from sound discriminator. Oscillator adjustments L1 and L2 shown on the schematic are factory control adjustments and should not be touched in the field.

Switch the receiver to channel 12.

Set the frequency standard to the proper frequency as listed in the alignment table.

Adjust L14 for indications as above.

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.

After the oscillator has been set on all channels, start back at channel 13 and recheck to make sure that all adjustments are correct.

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 T109. Tune in a television station and sync the picture if possible.

A.—Turn the horizontal hold control R173 to the extreme clockwise position. Adjust the T109 Frequency Adjustment (under 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 C153B, the width control L112 and the linearity control L113 until the picture is correct. If C153B, L112 or L113 was adjusted, repeat step A above.

Horizontal Locking Range Adjustment. — Turn the horizontal hold control fully counterclockwise. 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 C153A slightly clockwise. If less than 7 bars are present, adjust C153A slightly counterclockwise. Turn the horizontal hold control counterclockwise, 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 T109. Turn the horizontal hold control to the extreme clockwise position. With a thin fibre screwdriver, adjust the Oscillator Waveform Adjustment Core of T109 (on the outside of the chassis) until the horizontal blanking bar appears in the raster.

A.—Connect the low capacity probe of an oscilloscope to terminal C of T109. 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 20. Adjust the Oscillator Waveform Adjustment Core of T109 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 counterclockwise 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 3 bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C153A slightly clockwise. If less than 3 bars are present, adjust C153A slightly counterclockwise. Turn the horizontal hold control counterclockwise, momentarily remove the signal and recheck the number of bars present at the pull-in point. Repeat this procedure until 3 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 T109 Frequency Adjustment until this condition is fulfilled.

4.5 MC. VIDEO TRAP. — Tune in a strong station. With a very short clip lead, short circuit the trap winding of T103. Observe the picture for the appearance of a 4.5 mc. beat. If the beat appears in the picture, adjust L104 until the beat is eliminated. Remove the clip lead.

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 16 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.

ALIGNMENT TABLE. — Both methods of oscillator alignment are presented in the alignment table. The service technician may thereby choose the method to suit his test equipment.

8T270, 8TC270, 8TC271 ALIGNMENT TABLE

THE DETAILED ALIGNMENT PROCEDURE BEGINNING ON PAGE 10 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, V120)	21.25 .1 volt output	Not used		Not used	In series with 1 meg. to junction of R215 & R216		Detune T113 (bot.) Adjust T113 (top) for max. on meter	Fig. 13 Fig. 12 Fig. 11
2	"	"	"		"	Junct. of C183 & R215	Meter on 3 volt scale	T113 (bottom) for zero on meter	Fig. 13 Fig. 12
3	"	"	2nd sound i-f grid (pin 1, V120)	21.25 center 1 mc. wide .1 v. out	Junction of C183 & R215	Not used	Check for symmetrical response waveform (positive & negative). If not equal adjust T113 (top) until they are equal		Fig. 13 Fig. 15
4	1st sound i-f grid (pin 1, V119)	21.25 reduced output	1st sound i-f grid (pin 1, V119)	21.25 reduced output	Terminal A, T112 in series with a 33,000 ohm resistor.	"	Sweep output reduced to provide .3 volt p-to-p on scope	T112 (top & bot.) for max. gain and symmetry at 21.25 mc.	Fig. 13 Fig. 11 Fig. 12 Fig. 16
PICTURE I-F AND TRAP ADJUSTMENT									
5	Not Used		Not used		Not used	Junction of R135 & R136	Remove V108. Connect potentiometer between pins 5 & 6 of V108 socket	Adjust potentiometer for −4.5 volts on meter	Fig. 13 Fig. 11
6	Converter grid (pin 1, V2)	21.25	"		"	Across R120	Meter on 3 volt scale. Receiver between 2 & 13	T103 (top) for min. on meter	Fig. 11 Fig. 13
7	"	21.25	"		"	"	"	T105 (top) for min.	Fig. 13 Fig. 11
8	"	27.25	"		"	"	"	T102 (top) for min.	"
9	"	27.25	"		"	"	"	T104 (top) for min.	"
10	"	19.75	"		"	"	"	T106 (top) for min.	"
11	"	19.75	"		"	"	"	T101 (top) for min.	"
12	"	22.5	"		"	"	"	T106 (bottom) for max. on meter	Fig. 12
13	"	24.6	"		"	"	"	T104 (bottom) for max.	"
14	"	22.0	"		"	"	"	T103 (bottom) for max.	"
15	"	25.9	"		"	"	"	T102 (bottom) for max.	"
16	"	22.05 24.75	Converter grid (Pin 1, V2)	Sweeping 20 to 30 mc.	Pin 5, V106	Junction of R135 & R136	Shunt 300 ohms across pri. T102, T103, T104, T106. Set bias −2 V. Set swp. gen. for 4 V. P-P on scope.	Adjust T1 (top) and T101 (bottom) for proper response	Fig. 12 Fig. 17
17	"		"	"	"	"	Remove shunt resistors. Set bias to give 15 volts P to P on scope.	Adjust T1 (top), T101, T102, T103, T104, T106 (bot.) for proper resp.	Fig. 11 Fig. 12 Fig. 13 Fig. 18
ANTENNA, R-F AND CONVERTER LINE ALIGNMENT									
18	Antenna terminals	215.75	Not used		Not used	Junction of C183 & R215 for signal gen. method only	Fine tuning centered. Receiver on channel 13. Heterodyne meter coupled to oscillator if used.	C6 for zero on meter or beat on het. feq. meter	Fig. 13 Fig. 11
19						Junction of R133 & R134	Remove V101	Potentiometer for −3.5 volts on meter	Fig. 13 Fig. 11
20	Antenna terminal (loosely)	175.25 & 179.75	Antenna terminals (see text for precaution)	Sweeping channel 7	Test Connection R13	Not used	Receiver on channel 7	L6, C10, C11 & C14 for flat top response between markers. Markers above 90%.	Fig. 13 Fig. 12 Fig. 11 Fig. 19 (7)
21	"	205.25 209.75	"	channel 12	"	"	Receiver on channel 12	L6 for max. response and min. slope of top of curve	Fig. 11 Fig. 19 (12)
22	"	175.25 179.75	"	channel 7	"	"	Receiver on channel 7.	Check to see that response is as above	Fig. 19 (7)
23	"	181.25 185.75	"	channel 8	"	"	Receiver on channel 8	"	Fig. 19 (8)
24	"	187.25 191.75	"	channel 9	"	"	Receiver on channel 9	"	Fig. 19 (9)

ALIGNMENT TABLE

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
				R-F AND CONVERTER LINE ALIGNMENT (Cont'd)					
25	Antenna terminal (loosely)	193.25 197.75	Ant. terminals (see text for precaution)	channel 10	Test Connection R13	Not used	Receiver on channel 10	Check to see that response is as above	Fig. 19 (10)
26	"	199.25 203.75	"	channel 11	"	"	Receiver on channel 11	"	Fig. 19 (11)
27	"	205.25 209.75	"	channel 12	"	"	Receiver on channel 12	"	Fig. 19 (12)
28	"	211.25 215.75	"	channel 13	"	"	Receiver on channel 13	"	Fig. 19 (13)
29	If the response on any channel (steps 22 through 28) is below 80% at either marker, switch to that channel and adjust L6, C10, C11 & C14 to pull response up on that channel. Then recheck steps 22 through 28.								
30	Antenna terminals (loosely)	83.25 87.75	Ant. terminals (see text for precaution)	Sweeping chan. 6	Test Connection R13	Not used	Receiver on channel 6	L9, L13, L66 & C12 for response as above	Fig. 19 (6)
31	"	77.25 81.75	"	channel 5	"	"	Receiver on channel 5	Check to see that response is as above	Fig. 19 (5)
32	"	67.25 71.75	"	channel 4	"	"	Receiver on channel 4	"	Fig. 19 (4)
33	"	61.25 65.75	"	channel 3	"	"	Receiver on channel 3	"	Fig. 19 (3)
34	"	55.25 59.75	"	channel 2	"	"	Receiver on channel 2	"	Fig. 19 (2)
35	If the response on any channel (steps 31 through 34) is below 80% at either marker, switch to that channel and adjust L9, L13, L66 & C12 to pull response up on that channel. Then recheck steps 30 through 34. Replace V101. Disconnect bias pot and replace V108.								
				R-F OSCILLATOR ALIGNMENT					
STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT HETERODYNE FREQ. METER TO	HET. METER FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
36	Antenna terminals	215.75	Loosely coupled to r-f osc.	237	Not used	Junction of C183 & R215 for sig. gen. method only	Fine tuning centered. Receiver on channel 13	C6 for zero on meter or beat on het. freq. meter	Fig. 13 Fig. 12 Fig. 11
37	"	209.75	"	231	"	"	Rec. on chan. 12	L14 as above	Fig. 14
38	"	203.75	"	225	"	"	Rec. on chan. 11	L15 as above	"
39	"	197.75	"	219	"	"	Rec. on chan. 10	L16 as above	"
40	"	191.75	"	213	"	"	Rec. on chan. 9	L17 as above	"
41	"	185.75	"	207	"	"	Rec. on chan. 8	L18 as above	"
42	"	179.75	"	201	"	"	Rec. on chan. 7	L19 as above	"
43	"	87.75	"	109	"	"	Rec. on chan. 6	L31 as above	Fig. 12
44	"	81.75	"	103	"	"	Rec. on chan. 5	L21 as above	Fig. 14
45	"	71.75	"	93	"	"	Rec. on chan. 4	L22 as above	"
46	"	65.75	"	87	"	"	Rec. on chan. 3	L23 as above	"
47	"	59.75	"	81	"	"	Rec. on chan. 2	L24 as above	"
48	Repeat steps 36 through 47 as a check.								
				HORIZONTAL OSCILLATOR ADJUSTMENT					
49	Short circuit terminals C and D of T109. Tune in a station.								
50	Turn hold control fully clockwise. Adjust T109 Frequency Adjustment until horizontal blanking bar appears in the picture.								
51	Turn hold control ¼ turn from clockwise to sync picture. Adjust width (L110), linearity (L111) and drive (C153B) controls until picture is correct. Repeat step 50.								
52	Turn hold control fully counterclockwise. Momentarily remove signal. Turn hold control slowly clockwise. Note least number of bars before pull-in. Adjust Locking Range Control (C153A) for 7 to 9 bar pull-in.								
53	Remove clip from terminals C and D of T109. Turn hold control fully clockwise. Adjust T109 Oscillator Waveform Adjustment until horizontal blanking bar appears in picture.								
54	Connect low capacity probe of oscilloscope to terminal C of T109. Turn hold control ¼ turn from clockwise. Adjust T109 Oscillator Waveform Adjustment until broad and sharp peaks of wave on oscilloscope are same height. Keep picture in sync with hold control during adjustment. Remove oscilloscope.								
55	Turn hold control fully counterclockwise. Momentarily remove signal. Turn hold control slowly clockwise. Note least number of bars before pull-in. Adjust Locking Range Control (C153A) for 3 bar pull-in.								
56	Turn hold control fully clockwise. Adjust T109 Freq. Adjustment until horizontal blanking appears as single vertical or diagonal bar in pix.								
				4.5 MC VIDEO TRAP ADJUSTMENT					
57	Tune in a strong station. Short trap winding of T103 with a clip lead. If 4.5 mc beat appears in picture adjust L104 until beat is eliminated.								
				SENSITIVITY CHECK					
58	Connect antenna to receiver through attenuator pad to provide weak signal. Compare the picture and sound obtained to that obtained on other receivers under the same conditions.								

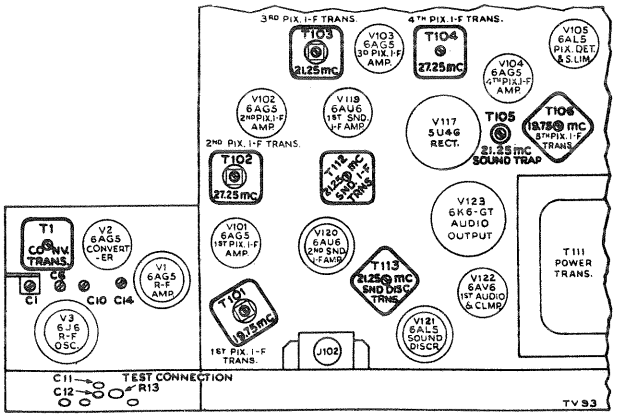


Figure 11—Top Chassis Adjustments

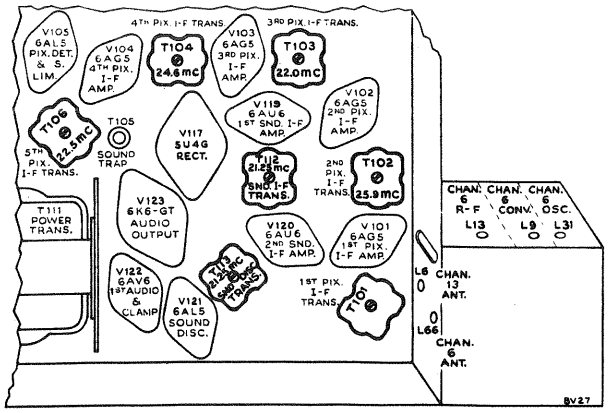


Figure 12—Bottom Chassis Adjustments

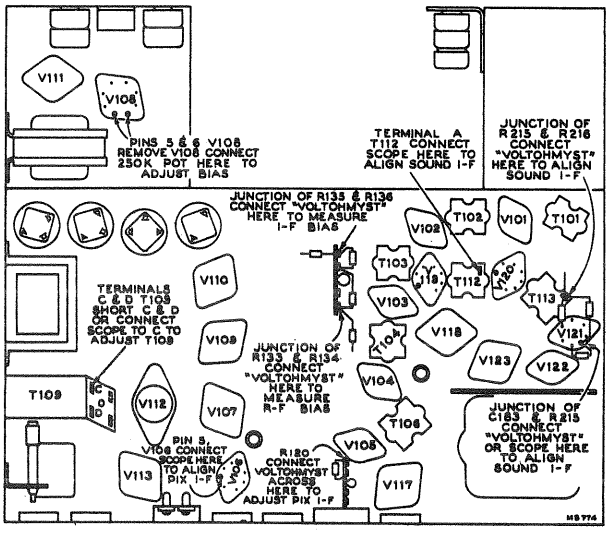
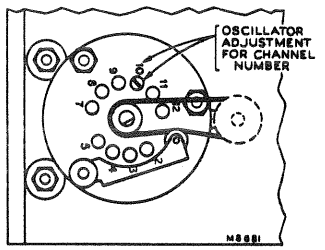


Figure 13—Test Connection Points



OSCILLATOR ADJUSTMENT FOR CHANNEL 13 IS ON TOP OF R-F UNIT AND CHANNEL 6 IS ON SIDE.

Figure 14—R-F Oscillator Adjustments

NOTE—FIGS. 11 AND 12: IN MODEL 8TK320 THE AUDIO OUTPUT TUBE (V123) IS TYPE 6V6GT.

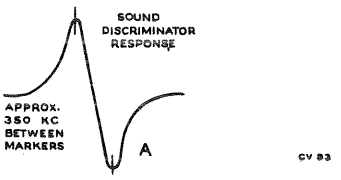


Figure 15 Discriminator Response

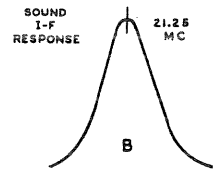


Figure 16 Sound I-F Response

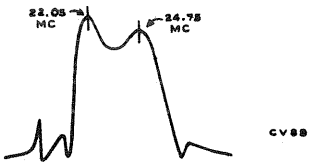


Figure 17 T1 and T101 Response

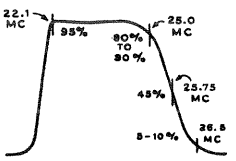


Figure 18 Overall I-F R-F Response

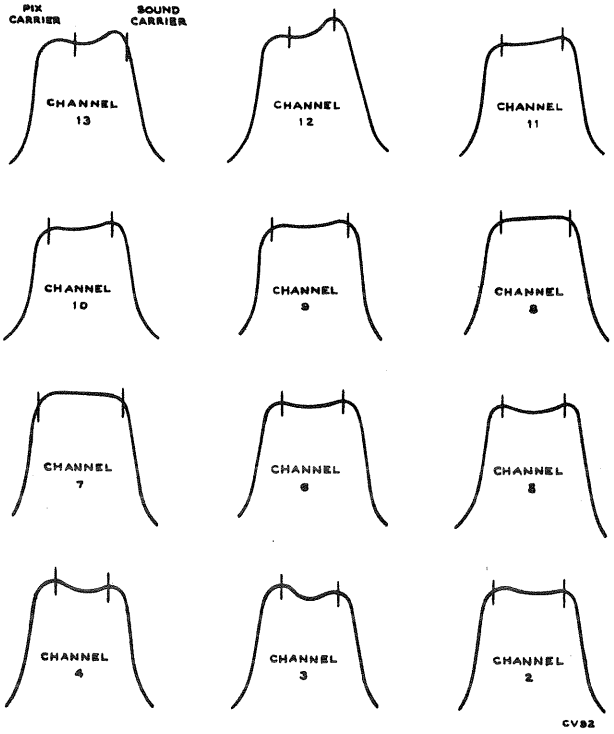


Figure 19—R-F Response

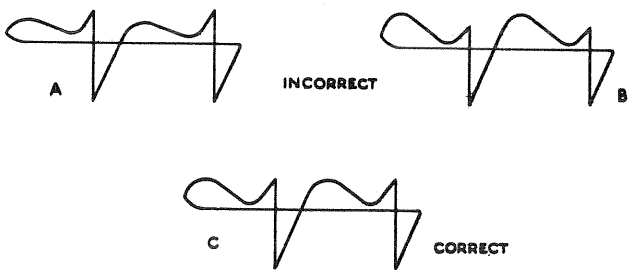
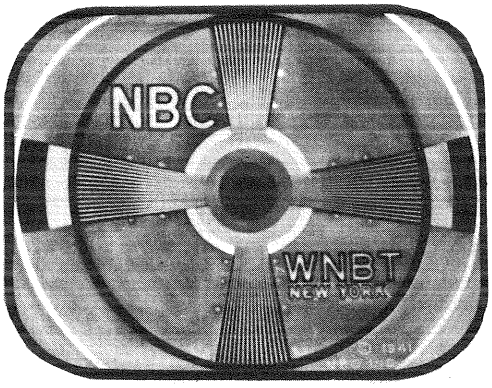
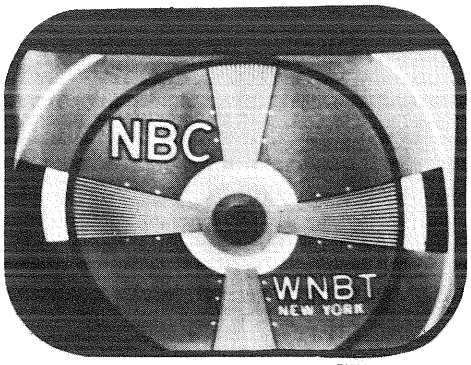


Figure 20—Horizontal Oscillator Waveforms



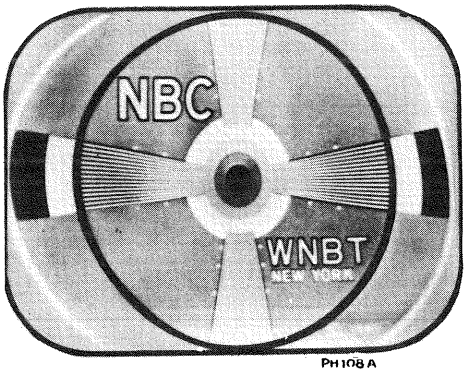
PH216

Figure 21—Normal Picture



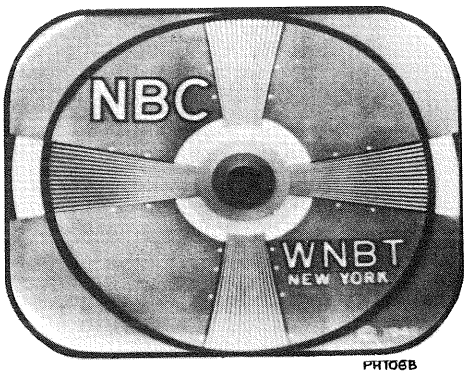
PH106B

Figure 22—Focus Coil and Ion Trap Magnet Misadjusted



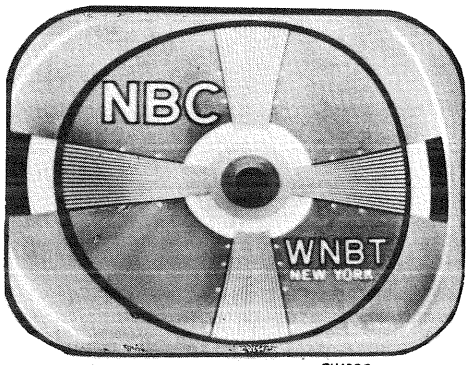
PH108A

Figure 23—Harizontal Linearity Control Misadjusted (Picture Cramped in Middle)



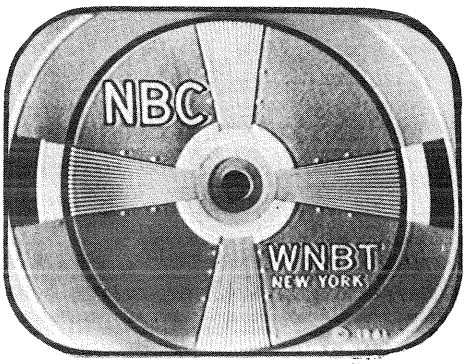
PH106B

Figure 24—Width Control Misadjusted



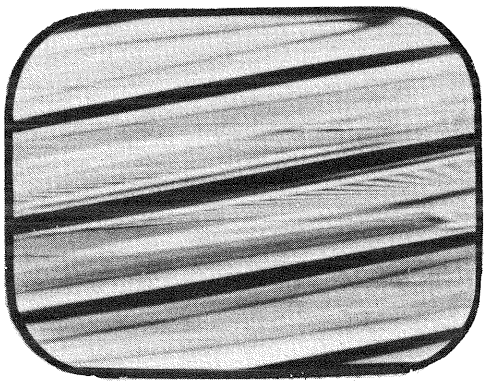
PH108C

Figure 25—Horizontal Drive Control Misadjusted



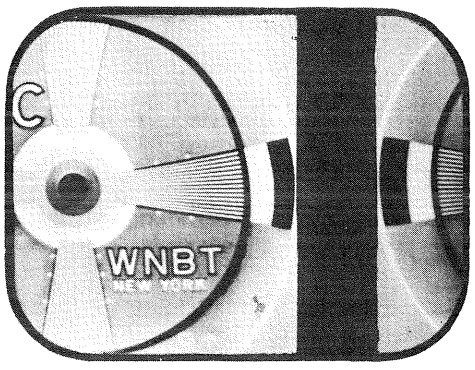
PH10

Figure 26—Transients



PH227-2

Figure 27—Test Pattern Showing Out of Sync Condition When Horizontal Hold Control Is in a Counterclockwise Position—Just Before Pulling Into Sync



PH109D

Figure 28—Test Pattern Showing Out of Sync Condition When Horizontal Hold Control Is at the Maximum Clockwise Position

8T270, 8TC270, 8TC271 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—Magnets reversed either front to back or top to bottom, front magnet incorrectly oriented.

(2) V113, V114 or V115 inoperative—check voltage and waveform on grids and plates.

(3) No high voltage—If horizontal deflection is operating as evidenced by the correct waveform on terminal 4 of horizontal output transformer, the trouble can be isolated to the 8016 circuit. Either the T110 high voltage winding is open (points 2 to 3), an 8016 tube is defective, its filament circuit is open, C167, C168 or C187 is shorted or R189, R190, R191, R192 or R193 is open.

(4) V112 circuit inoperative—Refer to schematic and waveform chart.

(5) Damper tube (V116) inoperative.

(6) Defective kinescope.

(7) R223 open (terminal 3 to R224).

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

NO VERTICAL DEFLECTION:

(1) V108B or V111 inoperative—check voltage and waveforms on grids and plates.

(2) T107 or T108 open.

(3) Vertical deflection coils open.

SMALL RASTER:

(1) Low Plus B or low line voltage.

(2) V113 defective.

POOR VERTICAL LINEARITY:

(1) If adjustment cannot correct, change V111.

(2) Vertical output transformer defective.

(3) V108B defective—check voltage and waveforms on grid and plate.

(4) C147, R164, C148B or C150C defective.

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

POOR HORIZONTAL LINEARITY:

(1) If adjustments do not correct, change V113 or V116.

(2) T110 or L113 defective.

(3) C164 or C165 defective.

WRINKLES ON LEFT SIDE OF RASTER:

(1) R166, R167 or C169 defective.

(2) Defective yoke.

PICTURE OUT OF SYNC HORIZONTALLY:

(1) T109 incorrectly tuned.

(2) R172, R173, R174, R176 or R178 defective.

TRAPEZOIDAL OR NON-SYMMETRICAL RASTER:

(1) Improper adjustment of focus coil 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 V119, V120, V121, V122, V123 and their socket voltages.

(3) T114 or C186 defective.

(4) Speaker defective.

SIGNAL AT KINESCOPE GRID BUT NO SYNC:

(1) V105A, V106, V108A, V109 or V111 inoperative—check voltage and waveforms at their grids and plates.

(2) Check V104. Try another tube.

SIGNAL ON KINESCOPE GRID BUT NO VERTICAL SYNC:

(1) Check V108B and associated circuit—C145, T107, etc.

(2) Integrating network inoperative—check.

(3) R154, R155, R157, R158 or R159 defective.

SIGNAL ON KINESCOPE GRID BUT NO HORIZONTAL SYNC:

(1) T109 misadjusted—readjust as instructed on page **13.**

(2) V112 inoperative—check socket voltages and waveforms.

(3) T109 defective.

(4) C140, C153A, C154, C155, C157 or C166 defective.

(5) If horizontal speed is completely off and cannot be adjusted check C158, C159, R172, R173, R174, R179 and R182.

SOUND AND RASTER BUT NO PICTURE OR SYNC:

(1) Picture i-f, detector or video amplifier inoperative—check V103, V104, V105, V106 and V107—check socket voltages.

(2) Bad contact to kinescope grid.

PICTURE STABLE BUT POOR RESOLUTION:

(1) V105A, V106 or V107 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) Check for proper operation of hold controls.

(2) If regular sections at the left picture are displaced change V113.

(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, V3.

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 V113.

LIGHT VERTICAL LINE ON LEFT OF PICTURE:

(1) C169 defective.

(2) V116 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 29 through 33 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.

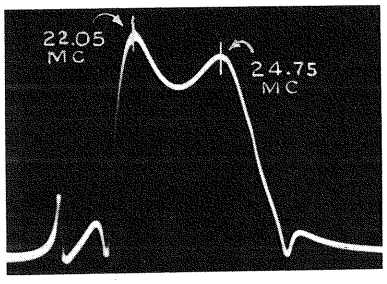


Figure 29—Response of Converter and First Pix I-F Transformer

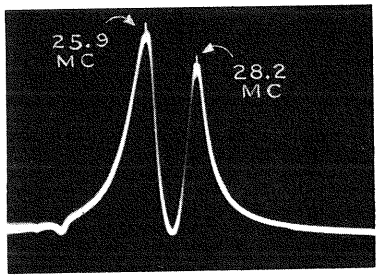


Figure 30—Response of Second Pix I-F Transformer

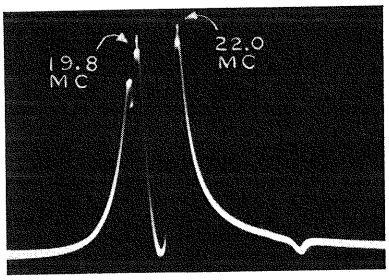


Figure 31—Response of Third Pix I-F Transformer

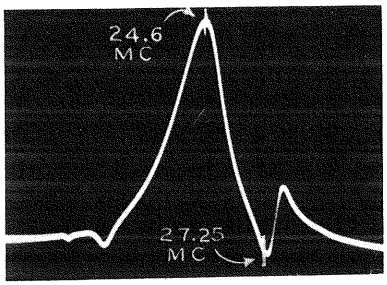


Figure 32—Response of Fourth Pix I-F Transformer

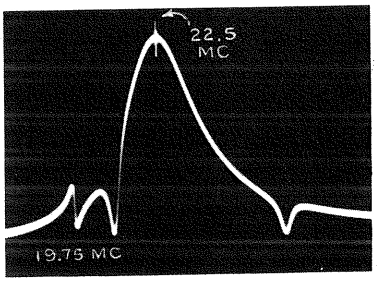


Figure 33—Response of Fifth Pix I-F Transformer

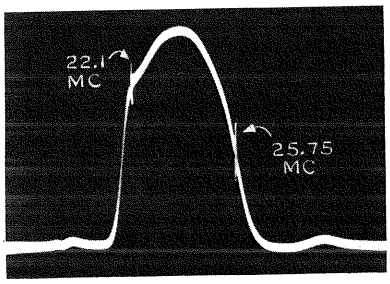


Figure 34—Response from First Pix I-F grid to Pix Det.

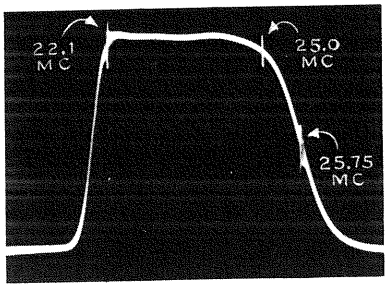


Figure 35—Overall Pix I-F Response

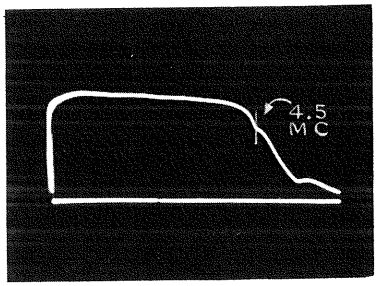


Figure 36—Video Response at Average Contrast

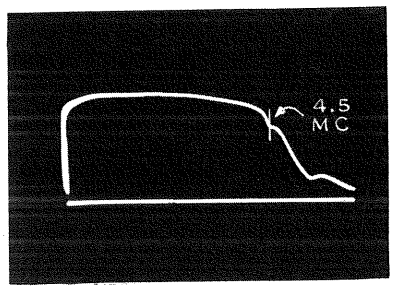


Figure 37—Video Response at Maximum Contrast

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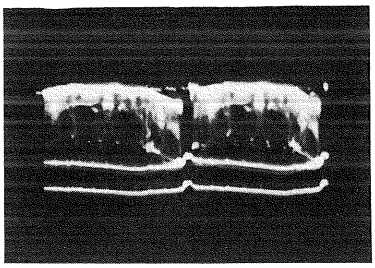
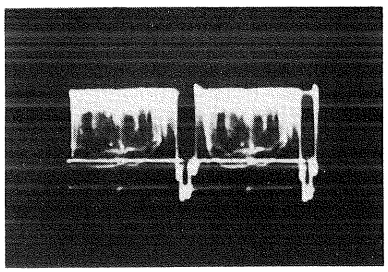
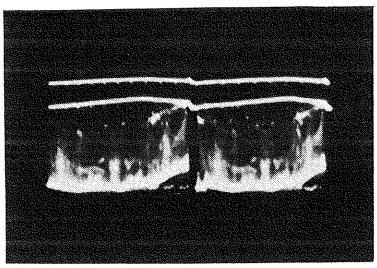


Video Signal Input to 1st Video Amplifier (Pin 1 of V106) (6AU6)

Figure 38—Vertical (Oscilloscope Synced to ½ of Vertical Sweep Rate) (2.1 Volts PP)

Figure 39—Horizontal (Oscilloscope Synced to ½ of Horizontal Sweep Rate) (2.1 Volts PP)

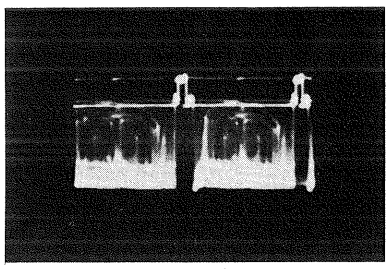


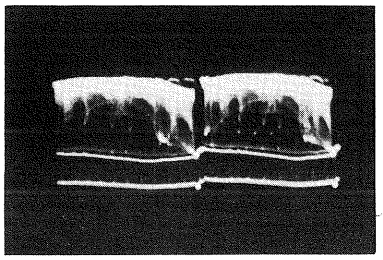


Input to 2nd Video Amplifier (Pin 5 of V107) (6K6GT)

Figure 40—Vertical (15 Volts PP)

Figure 41—Horizontal (15 Volts PP)

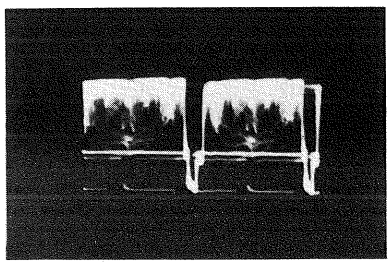


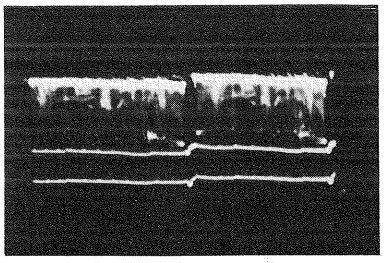


Output of 2nd Video Amplifier (Pin 3 of V107) (6K6GT) (Picture Max.)

Figure 42—Vertical (130 Volts PP)

Figure 43—Horizontal (130 Volts PP)

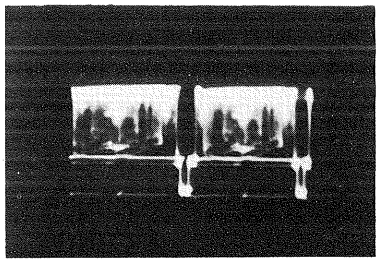


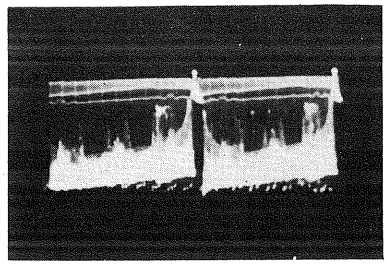


Input to Kinescope (Junction of R131 and R132) (Picture Max.)

Figure 44—Vertical (65 Volts PP)

Figure 45—Horizontal (65 Volts PP)

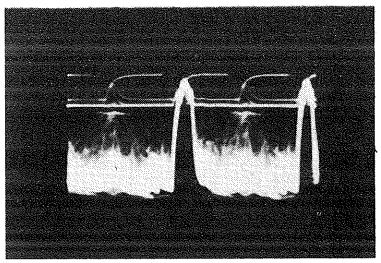


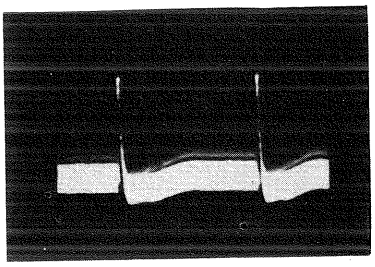


Input to 1st Sync Separator (Pin 1 of V109) (6SN7GT)

Figure 46—Vertical (24 Volts PP)

Figure 47—Horizontal (24 Volts PP)

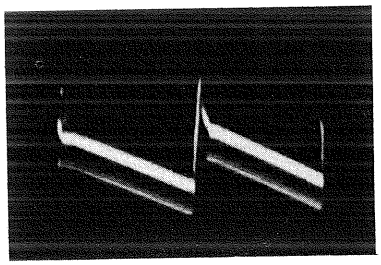


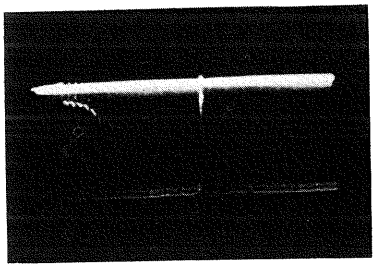


AGC Rectifier Cathode (Pin 6 of V109) (6SN7GT)

Figure 48—Vertical (4.3 Volts PP)

Figure 49—Horizontal (2.2 Volts PP)

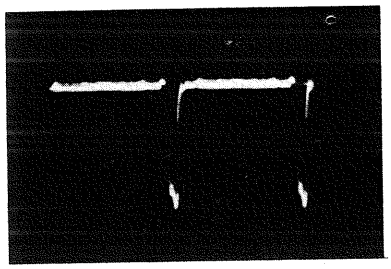


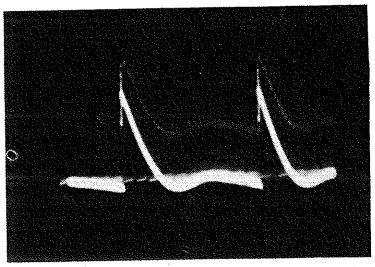


Output of AGC Rectifier (Pin 5 of V109) (6SN7GT)

Figure 50—Vertical (19 Volts PP)

Figure 51—Horizontal (19 Volts PP)

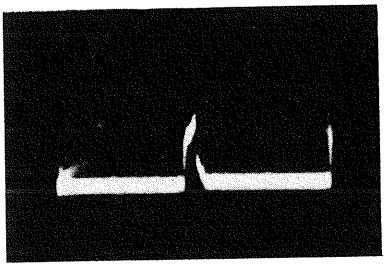


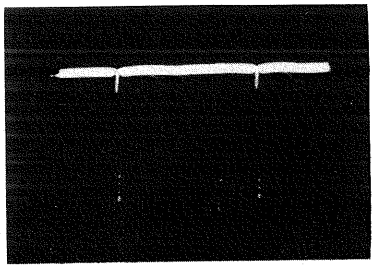


Cathode of 1st Sync Separator (Pin 3 of V109) (6SN7GT)

Figure 52—Vertical (1.3 Volts PP)

Figure 53—Horizontal (0.9 Volts PP)

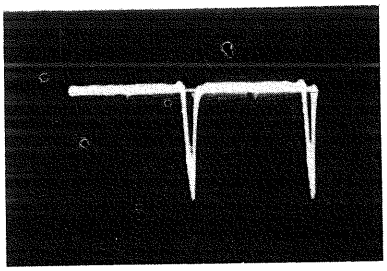


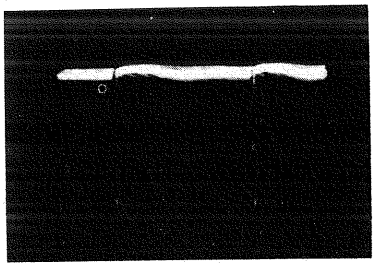


Output of 1st Sync Separator (Pin 2 of V109) (6SN7GT)

Figure 54—Vertical (48 Volts PP)

Figure 55—Horizontal (38 Volts PP)

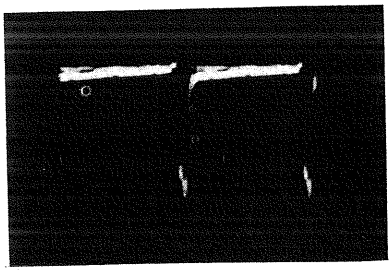




Input to Sync Amplifier (Junction of C137, C139 and R144)

Figure 56—Vertical (30 Volts PP)

Figure 57—Horizontal (17 Volts PP)



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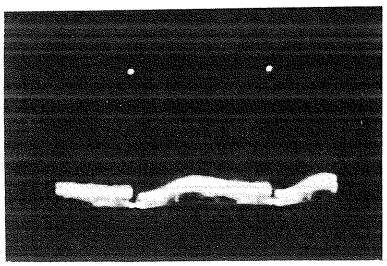
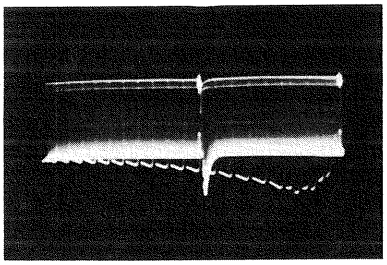


Output of Sync Amplifier (Pin 2 of V110) (6SN7GT)

Figure 58—Vertical (150 Volts PP)

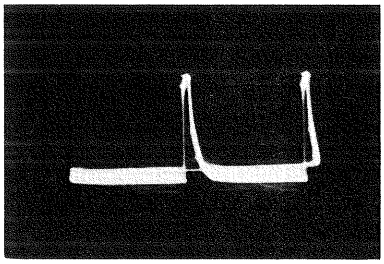
Figure 59—Horizontal (145 Volts PP)



Cathode of 2nd Sync Separator (Pin 6 of V110) (6SN7GT)

Figure 60—Vertical (17 Volts PP)

Figure 61—Horizontal (11 Volts PP)



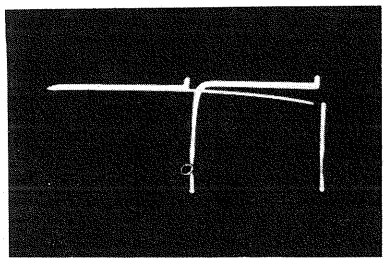
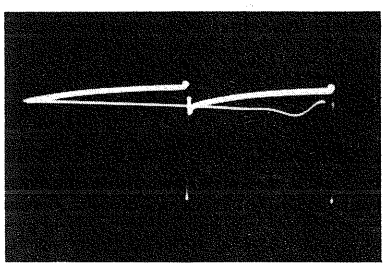


Figure 62—Output of Integrating Network (Junction of C144, C145 and R153) (38 Volts PP)

Figure 63—Grid of Vertical Oscillator (480 Volts PP) (Pin 1 of V108) (6SN7GT)



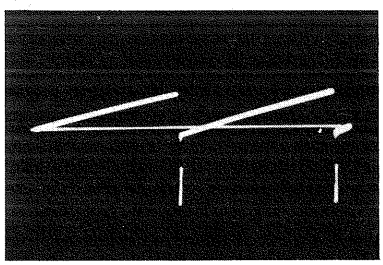
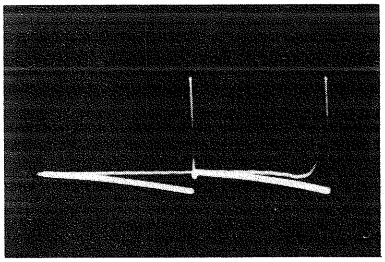


Figure 64—Grid of Vertical Output (140 Volts PP) (Pin 5 of V111) (6K6GT)

Figure 65—Plate of Vertical Output (925 Volts PP) (Pin 3 of V111) (6K6GT)



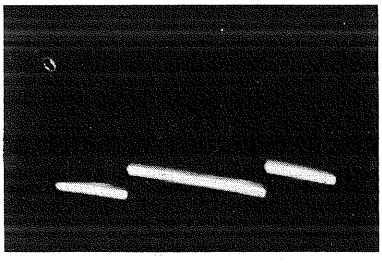
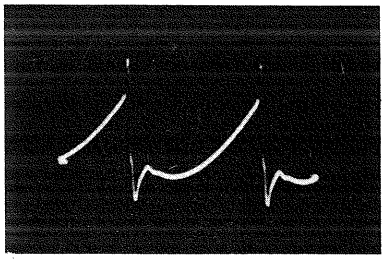


Figure 66—Input of Vertical Deflection Coils (75 Volts PP) (Junction of Green Lead of T108 and Green Lead of Yoke)

Figure 67—Input to Horizontal Oscillator (25 Volts PP) (Junction of C153A and C154)



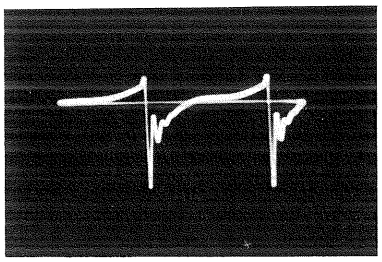
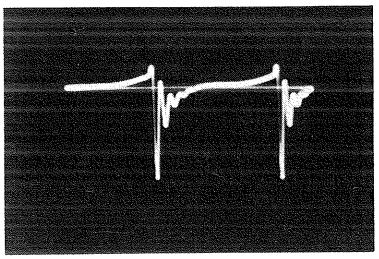


Figure 68—Junction of R168, R176 and R178 (140 Volts PP)

Figure 69—Grid of Horizontal Oscillator (500 Volts PP) (Pin 4 of V112) (6SN7GT)



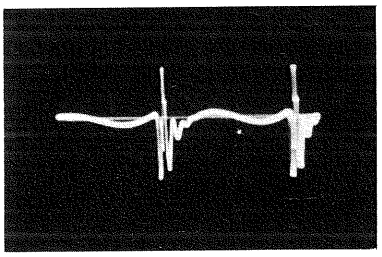
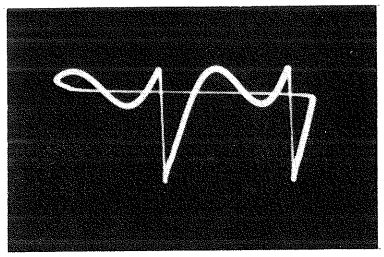


Figure 70—Plate of Horizontal Oscillator (280 Volts PP) (Pin 5 of V112) (6SN7GT)

Figure 71—Terminal "C" of T109 (85 Volts PP)



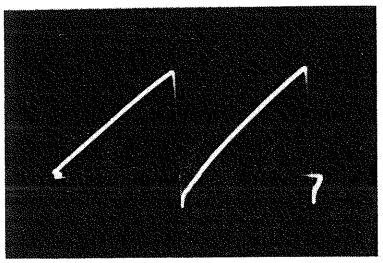
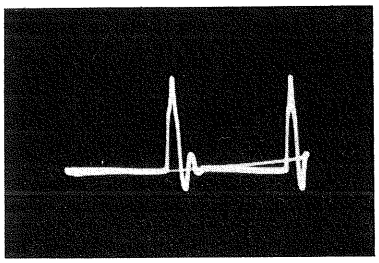


Figure 72—Input to Horizontal Output Tube (75 Volts PP) (Junction of C160, R181 and C153B)

Figure 73—Plate of Horizontal Output (Approx. 6,100 Volts PP) (Measured Through a Capacity Voltage Divider Connected from Top Cap of V113 to Ground)



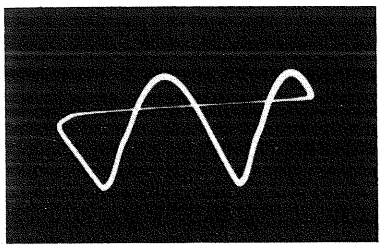
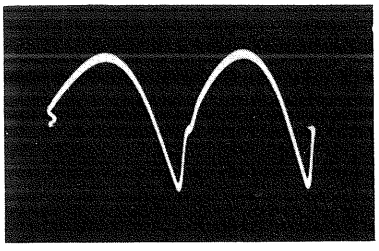


Figure 74—Junction of C164, L113 and Terminal 1 of T110 (80 Volts PP)

Figure 75—Cathode of Damper (50 Volts PP) (Pin 8 of V116) (5V4G)



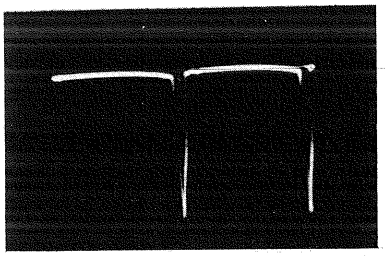
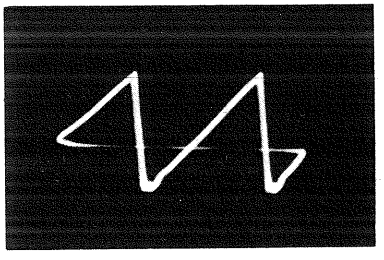


Figure 76—Input to Horizontal Deflection Coils (1,600 Volts PP) (Pin 4 of V116) (5V4G)

Figure 77—Horizontal Deflection Coil Current (800 ma PP) (Calculated Value from PP Voltage across R199)



8T270, 8TC270, 8TC271 R-F UNIT WIRING DIAGRAM

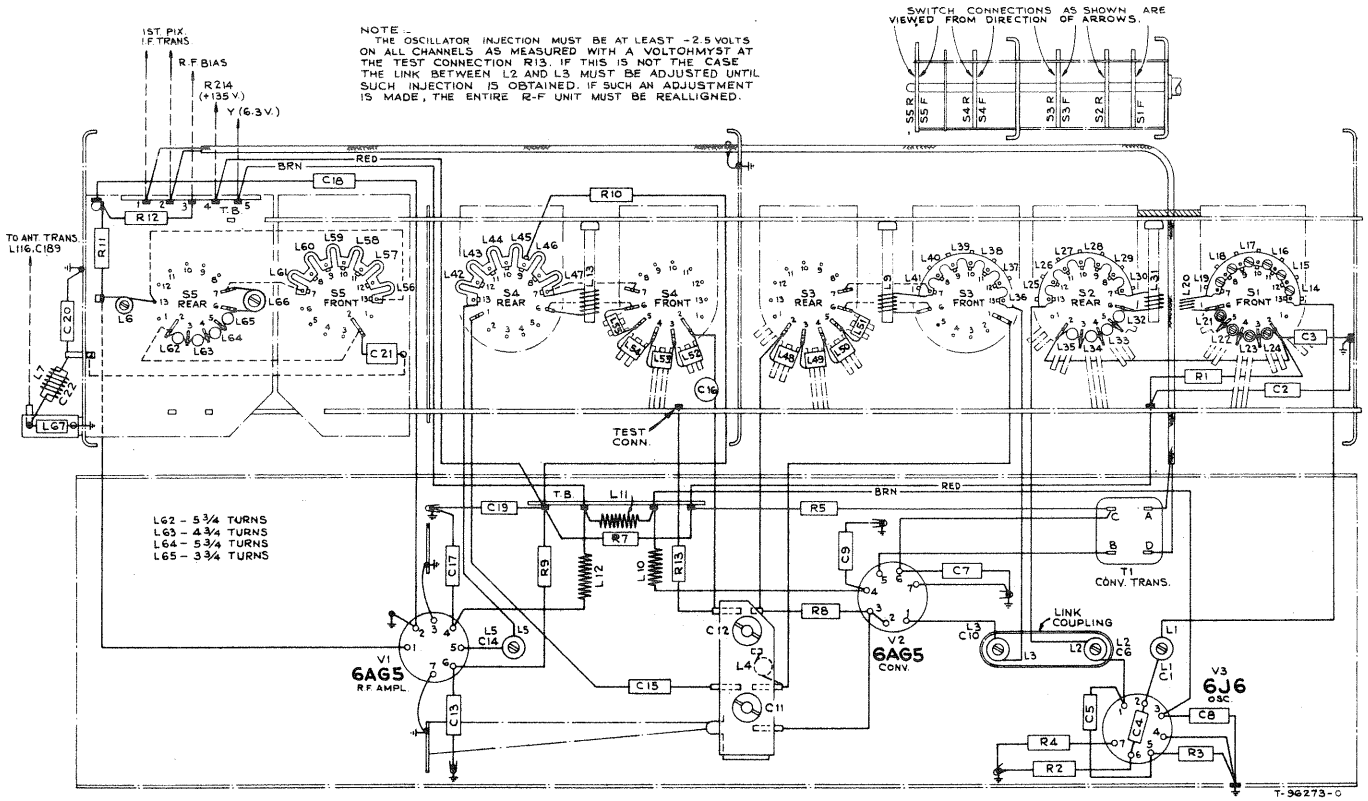


Figure 78—R-F Unit Wiring Diagram

CRITICAL LEAD DRESS:

1. The ground bus from pin 2 and the center shield of V120 socket should not be shortened or rerouted.
2. Dress the body of R195 as close to tube pin as possible.
3. Do not change the dress of the filament leads or the by-pass capacitors in the picture or sound i-f circuits. The filament leads between V120, V121 and V122 should be down against the chassis and away from grid or plate leads.
4. Dress all leads crossing the i-f circuits close to the chassis and held so they cannot move and change alignment.
5. If it is necessary to replace any of the 1500 mmf capacitors in the picture i-f circuit, the lead length must be kept as short as possible.
6. Picture i-f coupling capacitors C106, C111, C115 and C121 should be up and away from the chassis and should be clear of the pix i-f transformer adjustments by at least ¼ inch. If the dress of any of these capacitors is changed, the i-f alignment should be rechecked.
7. Leads to L102 and L103 must be as short as possible.
8. Dress peaking coils L105, L106, L107, L108 and L109 up and away from the chassis.
9. Dress R129 away from L109.
10. Dress C183 across V121 tube pins 5 and 6 with leads not exceeding ⅜ inch.
11. Dress the blue lead from pin 5 of V122 down against the chassis and under two shielded leads.
12. Dress C129 and C199 up and away from the chassis.
13. Dress the yellow lead from the picture control away from the chassis. Dress the yellow lead from pin 8 of V106 away from the chassis.
14. Dress the green lead from pin 8 of V107 away from the chassis.
15. Dress R168, R169, R170, R176 and R178 up and away from the chassis.
16. The leads to the volume control should be dressed down against the chassis and away from V119 and V120.
17. Dress the yoke red horizontal deflection lead under the clips of the fixed H. V. shield.
18. Dress the green lead from C166 close to the chassis and away from the red lead connected to T110-4.
19. Insert the red lead into T110-4 from the top of the terminal.
20. All soldered connections in the high voltage compartment should be free of sharp points.
21. Contact between the r-f oscillator frequency adjustment screws and the oscillator coils or channel switch eyelets must be avoided.

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
74155	Resistor—Voltage divider, comprising 1 section of 775 ohms, 9.5 watts, 1 section of 550 ohms, 5 watts, 1 section of 350 ohms, 3 watts, and 1 section of 450 ohms, 5 watts (R203A, R203B, R203C, R203D)
	Resistor—Fixed, composition, 1,000 ohms, ±20%, ½ watt (R103, R107, R108, R113, R116, R118, R165, R211)
	Resistor—Fixed, composition, 1,000 ohms, ±10%, ½ watt (R138)
	Resistor—Fixed, composition, 1,200 ohms, ±10%, ½ watt (R161, R208)
	Resistor—Fixed, composition, 1,500 ohms, ±10%, 2 watts (R221)
	Resistor—Fixed, composition, 3,300 ohms, ±10%, ½ watt (R188)
48207	Resistor—Wire wound, 3,300 ohms, 10 watts (R204)
	Resistor—Fixed, composition, 3,900 ohms, ±5%, 2 watts (R125, R128, R129)
	Resistor—Fixed, composition, 4,700 ohms, ±10%, ½ watt (R146)
	Resistor—Fixed, composition, 4,700 ohms, ±5%, ½ watt (R120)
	Resistor—Fixed, composition, 5,100 ohms, ±5%, ½ watt (R124)
	Resistor—Fixed, composition, 5,600 ohms, ±5%, ½ watt (R112)
	Resistor—Fixed, composition, 5,600 ohms, ±10%, 1 watt (R187)
	Resistor—Fixed, composition, 6,800 ohms, ±10%, ½ watt (R150)
	Resistor—Fixed, composition, 6,800 ohms, ±5%, 1 watt (R117)
	Resistor—Fixed, composition, 8,200 ohms, ±10%, ½ watt (R152, R153, R171)
	Resistor—Fixed, composition, 8,200 ohms, ±5%, ½ watt (R164, R175)
	Resistor—Fixed, composition, 10,000 ohms, ±10%, ½ watt (R141, R182, R224)
	Resistor—Fixed, composition, 10,000 ohms, ±5%, ½ watt (R104)
	Resistor—Fixed, composition, 12,000 ohms, ±5%, ½ watt (R136)
	Resistor—Fixed, composition, 12,000 ohms, ±10%, 2 watts (R147)
	Resistor—Fixed, composition, 18,000 ohms, ±10%, ½ watt (R137)
	Resistor—Fixed, composition, 22,000 ohms, ±20%, ½ watt (R195, R209, R210)
	Resistor—Fixed, composition, 22,000 ohms, ±10%, ½ watt (R145, R151, R177)
	Resistor—Fixed, composition, 47,000 ohms, ±20%, ½ watt (R225)
	Resistor—Fixed, composition, 47,000 ohms, ±10%, ½ watt (R142, R144, R222)
	Resistor—Fixed, composition, 56,000 ohms, ±10%, ½ watt (R156)
	Resistor—Fixed, composition, 56,000 ohms, ±5%, ½ watt (R135)
	Resistor—Fixed, composition, 82,000 ohms, ±10%, ½ watt (R172, R218)
	Resistor—Fixed, composition, 100,000 ohms, ±10%, ½ watt (R140, R160)
	Resistor—Fixed, composition, 100,000 ohms, ±5%, ½ watt (R215, R216)
	Resistor—Fixed, composition, 100,000 ohms, ±10%, 1 watt (R179)
	Resistor—Fixed, composition, 100,000 ohms, ±5%, 1 watt (R176)
	Resistor—Fixed, composition, 100,000 ohms, ±20%, 2 watt (R236)
	Resistor—Fixed, composition, 150,000 ohms, ±10%, ½ watt (R168, R180)
	Resistor—Fixed, composition, 150,000 ohms, ±10%, 1 watt (R174)
	Resistor—Fixed, composition, 150,000 ohms, ±5%, 1 watt (R178)
	Resistor—Fixed, composition, 180,000 ohms, ±10%, ½ watt (R143)
	Resistor—Fixed, composition, 180,000 ohms, ±10%, 2 watts (R191, R192, R193)
	Resistor—Fixed, composition, 220,000 ohms, ±10%, ½ watt (R154)
	Resistor—Fixed, composition, 330,000 ohms, ±10%, ½ watt (R212)
	Resistor—Fixed, composition, 360,000 ohms, ±5%, ½ watt (R134)
	Resistor—Fixed, composition, 470,000 ohms, ±20%, ½ watt (R219)
	Resistor—Fixed, composition, 560,000 ohms, ±10%, ½ watt (R194)
	Resistor—Fixed, composition, 820,000 ohms, ±5%, ½ watt (R169)
	Resistor—Fixed, composition, 1 megohm, ±20%, ½ watt (R139, R148)
	Resistor—Fixed, composition, 1 megohm, ±10%, ½ watt (R181)
	Resistor—Fixed, composition, 1.5 megohm, ±5%, ½ watt (R157)
	Resistor—Fixed, composition, 2.2 megohms, ±10%, ½ watt (R131, R132, R159, R163)
	Resistor—Fixed, composition, 2.7 megohms, ±5%, 1 watt (R170)
	Resistor—Fixed, composition, 3.9 megohms, ±10%, ½ watt (R149)
	Resistor—Fixed, composition, 4.7 megohms, ±5%, 1 watt (R133)
	Resistor—Fixed, composition, 10 megohms, ±20%, ½ watt (R213)
71456	Screw—No. 8-32 wing screw to mount hood and yoke (3 required)
73584	Shield—Tube shield for V120 and V121
73117	Socket—Tube socket, 7 pin, miniature
74251	Socket—Kinescope socket
31364	Socket—Pilot lamp socket for Models 8TC270 and 8TC271
31251	Socket—Tube socket, octal, wafer
31319	Socket—Tube socket, octal, moulded, saddle mounted
71508	Socket—Tube socket for 8016
73249	Socket—Tube socket, octal, ceramic, plate mounted
74151	Spacer—Bakelite spacer to mount moulded tube socket (2 required)
74152	Spring—Anode spring
72190	Spring—Hood and yoke pressure spring (3 required)
74149	Supports—Set of bakelite supports for horizontal plate assembly
74425	Support—Bakelite support for 2nd anode lead
74150	Support—Vertical plate support (bakelite)
74157	Switch—Interlock switch (S103)
74147	Switch—Width selector switch (S104)
46760	Switch—"TV Phono" switch (S105)
73571	Transformer—First pix I-F trans. (T101, C102, R101)
73572	Transformer—Second pix I-F transformer (T102, C107)

REPLACEMENT PARTS

STOCK No.	DESCRIPTION
	R-F UNIT ASSEMBLY KRK5A
73465	Belt—Drive belt
73478	Cable—I-F transmission cable (47/8") (W1)
73441	Cam—Fine tuning adjustment cam
74035	Capacitor—Ceramic, 5 mmf. (C4, C5)
53511	Capacitor—Ceramic, 10 mmf. (C3)
54207	Capacitor—Ceramic, 18 mmf. (C20)
73449	Capacitor—Ceramic trimmer, comprising 1 section of 150-190 mmf. and 1 section of 65-95 mmf. (C11, C12)
73091	Capacitor—Ceramic, 270 mmf. (C21)
71501	Capacitor—Ceramic, 1,500 mmf. (C2, C7, C8, C9, C13, C15, C17, C18, C19)
73473	Capacitor—Ceramic, 5,000 mmf. (C16)
73475	Coil—Antenna filter shunt coil (L67)
73477	Coil—Choke coil (L10, L11, L12)
73874	Coil—Converter grid coil for channel No. 6 (L9, L31)
73462	Coil—Coupling inductance coil (L4)
74108	Coil—Fine tuning coil (1½ turns) with adjustable inductance core and capacitor stud (threaded bushing type with plunger adjustment) (L1, C1)
73443	Coil—Fine tuning coil (1½ turns) with adjustable inductance core and capacitor stud (smooth bushing type with plunger adjustment) (L1, C1)
73476	Coil—I-F trap (L7, C22)
73461	Coil—Oscillator plate coil (4 turns) for channel No. 6 (L20)
73460	Coil—R-F plate coil for channel No. 6 (L13)
74109	Coil—Trimmer coil (1½ turns) with adjustable inductance core and capacitor stud (threaded bushing type with screw adjustment) for oscillator section or converter section (L2, C6, L3, C10)
73444	Coil—Trimmer coil (1½ turns) with adjustable inductance core and capacitor stud (smooth bushing type with screw adjustment) for oscillator section or converter section (L2, C6, L3, C10)
74110	Coil—Trimmer coil (3 turns) with adjustable inductance core and capacitor stud (threaded bushing type with screw adjustment) for r-f amplifier section (L5, C14)
73446	Coil—Trimmer coil (3 turns) with adjustable inductance core and capacitor stud (smooth bushing type with screw adjustment) for r-f amplifier section (L5, C14)
71493	Connector—Oscillator segment connector
74187	Core—Adjustable core for L31
73455	Core—Sliding core for fine tuning control trimmer
73440	Detent—R-F unit detent mechanism and fibre shaft
73453	Form—Coil form assembly for L9, L13
71487	Form—Coil form for oscillator plate coil L31
73442	Link—Link assembly for fine tuning
71462	Loop—Oscillator to converter trimmer loop connector
73634	Nut—Speed nut for drive belt shield
73467	Nut—Speed nut to mount trimmer coils 73443, 73444 and 73446
74166	Plate—Front plate and bushing
73464	Pulley—Idler pulley
	Resistor—Fixed, composition, 47 ohms, ±20%, ½ watt (R4)
	Resistor—Fixed, composition, 150 ohms, ±20%, ½ watt (R5, R9, R12)
	Resistor—Fixed, composition, 1,000 ohms, ±20%, ½ watt (R7)
	Resistor—Fixed, composition, 1,000 ohms, ±10%, ½ watt (R11)
	Resistor—Fixed, composition, 2,700 ohms, ±10%, ½ watt (R10)
	Resistor—Fixed, composition, 10,000 ohms, ±20%, ½ watt (R1)
	Resistor—Fixed, composition, 100,000 ohms, ±20%, ½ watt (R2, R3, R8, R13)
14343	Retainer—Channel selector shaft retaining ring
30340	Retainer—Retainer for fine tuning link stud
71476	Screw—No. 4-40 x ¼" binder head screw for adjusting coils L14, L15, L16, L17, L18, L19
71475	Screw—No. 4-40 x .296 adjusting screw for coils L6, L21, L22, L23, L24
73640	Screw—No. 4-40 x 3/8" adjusting screw for L66
74167	Shaft—Actuating shaft for fine tuning control
74168	Shaft—Channel selector shaft complete with pawl and stud
73438	Shaft—Fine tuning control shaft and pulley
72951	Shield—Metal tube shield for V3
73454	Shield—Metal shield for drive belt
73632	Shield—Metal tube shield for V1
71494	Socket—Tube socket
73450	Socket—Tube socket, ceramic, 7 prong bottom mounted
74188	Spring—Retaining spring for adjustable core No. 74187
73457	Spring—Return spring for fine tuning control core
73456	Spring—Tension spring for drive belt shield
73633	Stator—Antenna stator complete with rotor and coils (S5, L6, L56, L57, L58, L59, L60, L61, L62, L63, L64, L65, L66, C21)
73470	Stator—Converter stator complete with rotor and coils (S3, L36, L37, L38, L39, L40, L41, L48, L49, L50, L51)
73468	Stator—Front oscillator section stator complete with rotor, segment, coils and adjusting screws (S1, L14, L15, L16, L17, L18, L19, L21, L22, L23, L24)
73469	Stator—Rear oscillator section stator complete with rotor, segment and coils (S2, L25, L26, L27, L28, L29, L30, L32, L33, L34, L35)
73471	Stator—R-F amplifier stator complete with rotor and coils (S4, L42, L43, L44, L45, L46, L47, L52, L53, L54, L55)
2917	Washer—"C" washer for channel selector shaft
73466	Washer—Insulating washers for front shield (1 set)
73448	Transformer—Converter transformer (T1, R6)
	TELEVISION CHASSIS KCS29-8T270, KCS29A-8TC270 and 8TC271
73414	Cap—Hi-voltage rectifier and horizontal output plate cap
72809	Capacitor—Mica, 5 mmf. (C166)
74182	Capacitor—Ceramic, 6 mmf. (C126)
74105	Capacitor—Mica, 33 mmf. (C111)
64062	Capacitor—Ceramic, 82 mmf. (C120)
75060	Capacitor—Mica, 100 mmf., 1000 v. (C138)
39396	Capacitor—Ceramic, 100 mmf. (C175)
73921	Capacitor—Ceramic, 120 mmf. (C199)
51416	Capacitor—Mica, 180 mmf. (C140)
73102	Capacitor—Mica, 180 mmf. (C158)
74154	Capacitor—Ceramic, 250 mmf., 20,000 volts (C187)
73091	Capacitor—Mica, 270 mmf. (C106, C115, C121, C136)
73922	Capacitor—Ceramic, 270 mmf. (C183, C204)
39642	Capacitor—Mica, 390 mmf. (C141)
39644	Capacitor—Mica, 470 mmf. (C181)
74153	Capacitor—Ceramic, 500 mmf., 15,000 volts (C167, C168)
74250	Capacitor—Mica, 560 mmf. (C160)
73580	Capacitor—Mica trimmer, comprising 1 section of 10-160 mmf. and 1 section of 40-370 mmf. (C153A, C153B)
71501	Capacitor—Ceramic, 1,500 mmf. (C101, C103, C104, C105, C108, C109, C110, C113, C114, C117, C118,

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
	C122, C125, C132, C171, C172, C176, C177, C188, C191, C192, C193, C196)
73801	Capacitor—Tubular, moulded paper, .001 mfd., 600 volts (C137)
73803	Capacitor—Tubular, moulded paper, .0022 mfd., 600 volts (C142, C154, C184)
73595	Capacitor—Tubular, moulded paper, oil treated, .0022 mfd., 600 volts (C161)
73795	Capacitor—Tubular, moulded paper, .0033 mfd., 600 volts (C202)
73796	Capacitor—Tubular, moulded paper, .0039 mfd., 600 volts (C198)
73920	Capacitor—Tubular, moulded paper, oil treated, .0047 mfd., 600 volts (C145)
73550	Capacitor—Tubular, moulded paper, .0047 mfd., 600 volts (C127, C143, C144, C186, C195, C200)
73561	Capacitor—Tubular, moulded paper, .01 mfd., 400 volts (C134, C151, C152, C182)
73594	Capacitor—Tubular, moulded paper, oil treated, .01 mfd., 600 volts (C159)
73565	Capacitor—Tubular, moulded paper, .01 mfd., 1,000 volts (C185)
73562	Capacitor—Tubular, moulded paper, .022 mfd., 400 volts (C155)
73596	Capacitor—Tubular, moulded paper, oil treated, .033 mfd., 1,000 volts (C164)
73553	Capacitor—Tubular, moulded paper, .047 mfd., 400 volts (C129, C139)
73592	Capacitor—Tubular, moulded paper, .047 mfd., 600 volts (C147, C156)
73597	Capacitor—Tubular, moulded paper, oil treated, .047 mfd., 1,000 volts (C165)
73564	Capacitor—Tubular, moulded paper, .047 mfd., 1,000 volts (C163)
73784	Capacitor—Tubular, moulded paper, 0.1 mfd., 200 volts (C201)
73551	Capacitor—Tubular, moulded paper, 0.1 mfd., 400 volts (C130, C149)
73560	Capacitor—Tubular, moulded paper, 0.22 mfd., 200 volts (C135)
73794	Capacitor—Tubular, moulded paper, 0.22 mfd., 400 volts (C157, C162)
73787	Capacitor—Tubular, moulded paper, 0.47 mfd., 200 volts (C133, C190)
74106	Capacitor—Electrolytic, 5 mfd., 50 volts (C131)
74266	Capacitor—Electrolytic, 40 mfd., 400 volts (C205)
71432	Capacitor—Electrolytic, comprising 2 sections of 40 mfd., 450 volts, and 1 section of 10 mfd., 450 volts (C150A, C150B, C150C)
73581	Capacitor—Electrolytic, comprising 1 section of 60 mfd., 450 volts, 2 sections of 10 mfd., 450 volts, and 1 section of 20 mfd., 150 volts (C146A, C146B, C146C, C146D)
73582	Capacitor—Electrolytic, comprising 1 section of 40 mfd., 450 volts, 1 section of 10 mfd., 450 volts, and 1 section of 80 mfd., 200 volts (C194A, C194B, C194C)
73583	Capacitor—Electrolytic, comprising 1 section of 40 mfd., 450 volts, 1 section of 90 mfd., 450 volts, and 1 section of 50 mfd., 150 volts (C148A, C148B, C148C)
71436	Capacitor—Electrolytic, comprising 1 section of 250 mfd., 10 volts, and 1 section of 1,000 mfd., 6 volts (C170A, C170B)
73154	Choke—Filter choke (L116)
73578	Coil—Antenna matching coils complete with socket and bracket (T115)
73477	Coil—Choke coil (L101)
74142	Coil—Focus coil (L117)
71449	Coil—Horizontal linearity control coil (L113)
74170	Coil—Peaking coil (36 mh) (L119, R110)
71527	Coil—Peaking coil (93 mh) (L107)
71529	Coil—Peaking coil (120 mh) (L102, R119, L108, R226)
74214	Coil—Peaking coil (180 mh) (L106)
71528	Coil—Peaking coil (180 mh) (L105, R123, L109, R130)
71526	Coil—Peaking coil (250 mh) (L103)
71429	Coil—Width control coil (L112)
74160	Connector—Anode connector
35787	Connector—Phono input connector (J110)
71521	Contact—Hi-voltage capacitor contact
74047	Control—Brightness and picture control (R127, R223)
72735	Control—Focus control (R201)
71440	Control—Height control (R155)
74146	Control—Horizontal centering or video bias control (R199, R206)
72734	Control—Horizontal and vertical hold control (R158, R173)
74048	Control—Tone control, volume control and power switch (R197, R217, S101)
71441	Control—Vertical linearity control (R162)
71443	Control—Vertical centering control (R202)
71457	Cord—Power cord and plug
71437	Cover—Insulating cover for electrolytics Nos. 71432, 73581 and 73583
72772	Cover—Insulating cover for electrolytics No. 71436
73590	Cushion—Deflection yoke hood cushion (2 required)
73600	Fuse—0.25 ampere, 250 volts (F101, F102)
37396	Grommet—Rubber grommet to mount ceramic tube socket (2 required)
71799	Grommet—Rubber grommet for 2nd anode lead
74148	Magnet—Ion trap magnet (PM type)
18469	Plate—Bakelite mounting plate for electrolytics
5119	Plug—3 contact female plug for speaker cable
71448	Plug—Male plug for power cable
74156	Resistor—Wire wound, 3.9 ohms, 1/3 watt (R189, R190)
72067	Resistor—Wire wound, 5.1 ohms, ½ watt (R214)
	Resistor—Fixed, composition, 10 ohms, ±20%, ½ watt (R121)
	Resistor—Fixed, composition, 39 ohms, ±10%, ½ watt (R102, R111)
	Resistor—Fixed, composition, 47 ohms, ±20%, ½ watt (R183)
	Resistor—Fixed, composition, 68 ohms, ±10%, ½ watt (R105)
	Resistor—Fixed, composition, 82 ohms, ±10%, ½ watt (R207)
	Resistor—Fixed, composition, 82 ohms, ±5%, ½ watt (R122)
	Resistor—Fixed, composition, 100 ohms, ±10%, ½ watt (R228)
	Resistor—Fixed, composition, 120 ohms, ±10%, ½ watt (R126)
	Resistor—Fixed, composition, 150 ohms, ±20%, ½ watt (R106, R109, R114, R198)
	Resistor—Fixed, composition, 150 ohms, ±10%, ½ watt (R115)
	Resistor—Fixed, composition, 150 ohms, ±10%, 2 watts (R184)
74197	Resistor—Wire wound, 470 ohms, 4 watts (R200)
	Resistor—Fixed, composition, 680 ohms, ±10%, 1 watt (R220)
74213	Resistor—Wire wound, 820 ohms, 4 watts (R205)

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
74155	Resistor—Voltage divider, comprising 1 section of 775 ohms, 9.5 watts, 1 section of 550 ohms, 5 watts, 1 section of 350 ohms, 3 watts, and 1 section of 450 ohms, 5 watts (R203A, R203B, R203C, R203D)
	Resistor—Fixed, composition, 1,000 ohms, ±20%, ½ watt (R103, R107, R108, R113, R116, R118, R165, R211)
	Resistor—Fixed, composition, 1,000 ohms, ±10%, ½ watt (R138)
	Resistor—Fixed, composition, 1,200 ohms, ±10%, ½ watt (R161, R208)
	Resistor—Fixed, composition, 1,500 ohms, ±10%, 2 watts (R221)
	Resistor—Fixed, composition, 3,300 ohms, ±10%, ½ watt (R188)
48207	Resistor—Wire wound, 3,300 ohms, 10 watts (R204)
	Resistor—Fixed, composition, 3,900 ohms, ±5%, 2 watts (R125, R128, R129)
	Resistor—Fixed, composition, 4,700 ohms, ±10%, ½ watt (R146)
	Resistor—Fixed, composition, 4,700 ohms, ±5%, ½ watt (R120)
	Resistor—Fixed, composition, 5,100 ohms, ±5%, ½ watt (R124)
	Resistor—Fixed, composition, 5,600 ohms, ±5%, ½ watt (R112)
	Resistor—Fixed, composition, 5,600 ohms, ±10%, 1 watt (R187)
	Resistor—Fixed, composition, 6,800 ohms, ±10%, ½ watt (R150)
	Resistor—Fixed, composition, 6,800 ohms, ±5%, 1 watt (R117)
	Resistor—Fixed, composition, 8,200 ohms, ±10%, ½ watt (R152, R153, R171)
	Resistor—Fixed, composition, 8,200 ohms, ±5%, ½ watt (R164, R175)
	Resistor—Fixed, composition, 10,000 ohms, ±10%, ½ watt (R141, R182, R224)
	Resistor—Fixed, composition, 10,000 ohms, ±5%, ½ watt (R104)
	Resistor—Fixed, composition, 12,000 ohms, ±5%, ½ watt (R136)
	Resistor—Fixed, composition, 12,000 ohms, ±10%, 2 watts (R147)
	Resistor—Fixed, composition, 18,000 ohms, ±10%, ½ watt (R137)
	Resistor—Fixed, composition, 22,000 ohms, ±20%, ½ watt (R195, R209, R210)
	Resistor—Fixed, composition, 22,000 ohms, ±10%, ½ watt (R145, R151, R177)
	Resistor—Fixed, composition, 47,000 ohms, ±20%, ½ watt (R225)
	Resistor—Fixed, composition, 47,000 ohms, ±10%, ½ watt (R142, R144, R222)
	Resistor—Fixed, composition, 56,000 ohms, ±10%, ½ watt (R156)
	Resistor—Fixed, composition, 56,000 ohms, ±5%, ½ watt (R135)
	Resistor—Fixed, composition, 82,000 ohms, ±10%, ½ watt (R172, R218)
	Resistor—Fixed, composition, 100,000 ohms, ±10%, ½ watt (R140, R160)
	Resistor—Fixed, composition, 100,000 ohms, ±5%, ½ watt (R215, R216)
	Resistor—Fixed, composition, 100,000 ohms, ±10%, 1 watt (R179)
	Resistor—Fixed, composition, 100,000 ohms, ±5%, 1 watt (R176)
	Resistor—Fixed, composition, 100,000 ohms, ±20%, 2 watt (R236)
	Resistor—Fixed, composition, 150,000 ohms, ±10%, ½ watt (R168, R180)
	Resistor—Fixed, composition, 150,000 ohms, ±10%, 1 watt (R174)
	Resistor—Fixed, composition, 150,000 ohms, ±5%, 1 watt (R178)
	Resistor—Fixed, composition, 180,000 ohms, ±10%, ½ watt (R143)
	Resistor—Fixed, composition, 180,000 ohms, ±10%, 2 watts (R191, R192, R193)
	Resistor—Fixed, composition, 220,000 ohms, ±10%, ½ watt (R154)
	Resistor—Fixed, composition, 330,000 ohms, ±10%, ½ watt (R212)
	Resistor—Fixed, composition, 360,000 ohms, ±5%, ½ watt (R134)
	Resistor—Fixed, composition, 470,000 ohms, ±20%, ½ watt (R219)
	Resistor—Fixed, composition, 560,000 ohms, ±10%, ½ watt (R194)
	Resistor—Fixed, composition, 820,000 ohms, ±5%, ½ watt (R169)
	Resistor—Fixed, composition, 1 megohm, ±20%, ½ watt (R139, R148)
	Resistor—Fixed, composition, 1 megohm, ±10%, ½ watt (R181)
	Resistor—Fixed, composition, 1.5 megohm, ±5%, ½ watt (R157)
	Resistor—Fixed, composition, 2.2 megohms, ±10%, ½ watt (R131, R132, R159, R163)
	Resistor—Fixed, composition, 2.7 megohms, ±5%, 1 watt (R170)
	Resistor—Fixed, composition, 3.9 megohms, ±10%, ½ watt (R149)
	Resistor—Fixed, composition, 4.7 megohms, ±5%, 1 watt (R133)
	Resistor—Fixed, composition, 10 megohms, ±20%, ½ watt (R213)
71456	Screw—No. 8-32 wing screw to mount hood and yoke (3 required)
73584	Shield—Tube shield for V120 and V121
73117	Socket—Tube socket, 7 pin, miniature
74251	Socket—Kinescope socket
31364	Socket—Pilot lamp socket for Models 8TC270 and 8TC271
31251	Socket—Tube socket, octal, wafer
31319	Socket—Tube socket, octal, moulded, saddle mounted
71508	Socket—Tube socket for 8016
73249	Socket—Tube socket, octal, ceramic, plate mounted
74151	Spacer—Bakelite spacer to mount moulded tube socket (2 required)
74152	Spring—Anode spring
72190	Spring—Hood and yoke pressure spring (3 required)
74149	Supports—Set of bakelite supports for horizontal plate assembly
74425	Support—Bakelite support for 2nd anode lead
74150	Support—Vertical plate support (bakelite)
74157	Switch—Interlock switch (S103)
74147	Switch—Width selector switch (S104)
46760	Switch—"TV Phono" switch (S105)
73571	Transformer—First pix I-F trans. (T101, C102, R101)
73572	Transformer—Second pix I-F transformer (T102, C107)

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
73573	Transformer—Third pix I-F transformer (T103, C112)
73574	Transformer—Fourth pix I-F transformer (T104, C116)
73575	Transformer—Fifth pix I-F transformer (T106, C123, C124)
74144	Transformer—Vertical oscillator transformer (T107)
73568	Transformer—Vertical output transformer (T108)
73576	Transformer—Horizontal oscillator transformer (T109)
74145	Transformer—Horizontal output and hi-voltage transformer (T110)
74143	Transformer—Power transformer, 115 volt, 60 cycles (T111)
71424	Transformer—Sound I-F transformer (T112, C173, C174)
71427	Transformer—Sound discriminator transformer (T113, C178, C179, C180)
71419	Transformer—Audio output transformer (T114)
73577	Trap—4.5 mc video trap (L104, C128)
71778	Trap—Sound trap (T105, C119)
73476	Trap—I-F trap (L118, C189)
74141	Yoke—Deflection yoke (L110, L111, L114, L115, C169, R166, R167)
	SPEAKER ASSEMBLY 92580-2W RL 105A3
31825	Cap—Dust cap
73912	Cone—Cone and voice coil assembly
5118	Plug—3 prong male plug for speaker
74169	Speaker—8" P.M. speaker complete with cone and voice coil, less plug
	MISCELLANEOUS
74158	Back—Cabinet back
72857	Board—"Antenna" board
71599	Bracket—Pilot lamp bracket for Models 8TC270 and 8TC271
13103	Cap—Pilot lamp jewel
73754	Catch—Bullet catch and strike (2 required) for Models 8TC270 and 8TC271
X1917	Cloth—Grille cloth for mahogany or walnut instruments for Model 8T270
X1918	Cloth—Grille cloth for toasted mahogany instruments for Model 8T270
74160	Connector—Anode connector (3 required)
74127	Cushion—Cushion strip for back of safety glass (4 required)
74116	Decal—Control panel decal for mahogany or walnut instruments
74117	Decal—Control panel decal for toasted mahogany instruments
71768	Decal—Trade mark decal (RCA Victor) for Model 8TC271
71984	Decal—Trade mark decal (RCA Victor) for Model 8TC270
73180	Emblem—"RCA Victor" emblem
73642	Escutcheon—Channel marker escutcheon for walnut or mahogany instruments
73740	Escutcheon—Channel marker escutcheon for toasted mahogany instruments
72113	Foot—Rubber foot (4 required) for Model 8T270
74306	Glass—Safety glass for Model 8TC271
74125	Glass—Safety glass for Model 8T270
74252	Glass—Safety glass for Model 8TC270
74308	Hinge—Door hinge (1 set) for Model 8TC271 (2 required)
73903	Hinge—Door hinge (1 set for 1 door) for Model 8T270
73224	Knob—Channel selector knob—dark—for walnut or mahogany instruments
73225	Knob—Channel selector knob — tan — for toasted mahogany instruments
73222	Knob—Fine tuning knob — dark — for walnut or mahogany instruments
73223	Knob—Fine tuning knob — tan — for toasted mahogany instruments
73228	Knob—Horizontal hold, picture control or volume control knob—dark—for walnut or mahogany instruments
73229	Knob—Horizontal hold, picture control or volume control knob—tan for toasted mahogany instruments
73226	Knob—Vertical hold, brightness control or tone control knob—dark—for walnut or mahogany instruments
73227	Knob—Vertical hold, brightness control or tone control knob—tan—for toasted mahogany instruments
11765	Lamp—Pilot lamp
74126	Mask—Kinescope mask
74123	Ornament—Front panel metal ornament for Model 8T270
74313	Ornament—Wood fibre ornament for front of cabinet for Model 8TC271
74111	Plate—Door pull back plate — R.H. — for Model 8TC271
74112	Plate—Door pull back plate — L.H. — for Model 8TC271
74115	Plate—Stud and plate including wing nut and spring for front panel (2 required) for 8TC270 and 8TC271
74162	Plate—Mounting plate for interlock switch
74124	Plate—Stud and plate including wing nut and spring for front panel (2 required) for Model 8T270
39153	Plug—4 prong male plug for antenna cable
74253	Pull—Door pull for R.H. door for Model 8TC270
74254	Pull—Door pull for L.H. door for Model 8TC270
73771	Pull—Door pull (2 required) for Model 8TC271
74307	Screw—No. 8-32 x 1/8 tremit head screw for door pulls for Model 8TC271
74171	Shield—Cellulose shield for kinescope
30330	Spring—Retaining spring for knobs
14270	Spring—Retaining spring for knobs
72845	Spring—Retaining spring for knobs
73643	Spring—Spring clip for channel marker escutcheon
72936	Stop—Door stop for Models 8TC270 and 8TC271
74161	Stud—Locating stud for cabinet back (2 required)
74159	Support—Moulded insulator supports for kinescope (4 required)

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

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

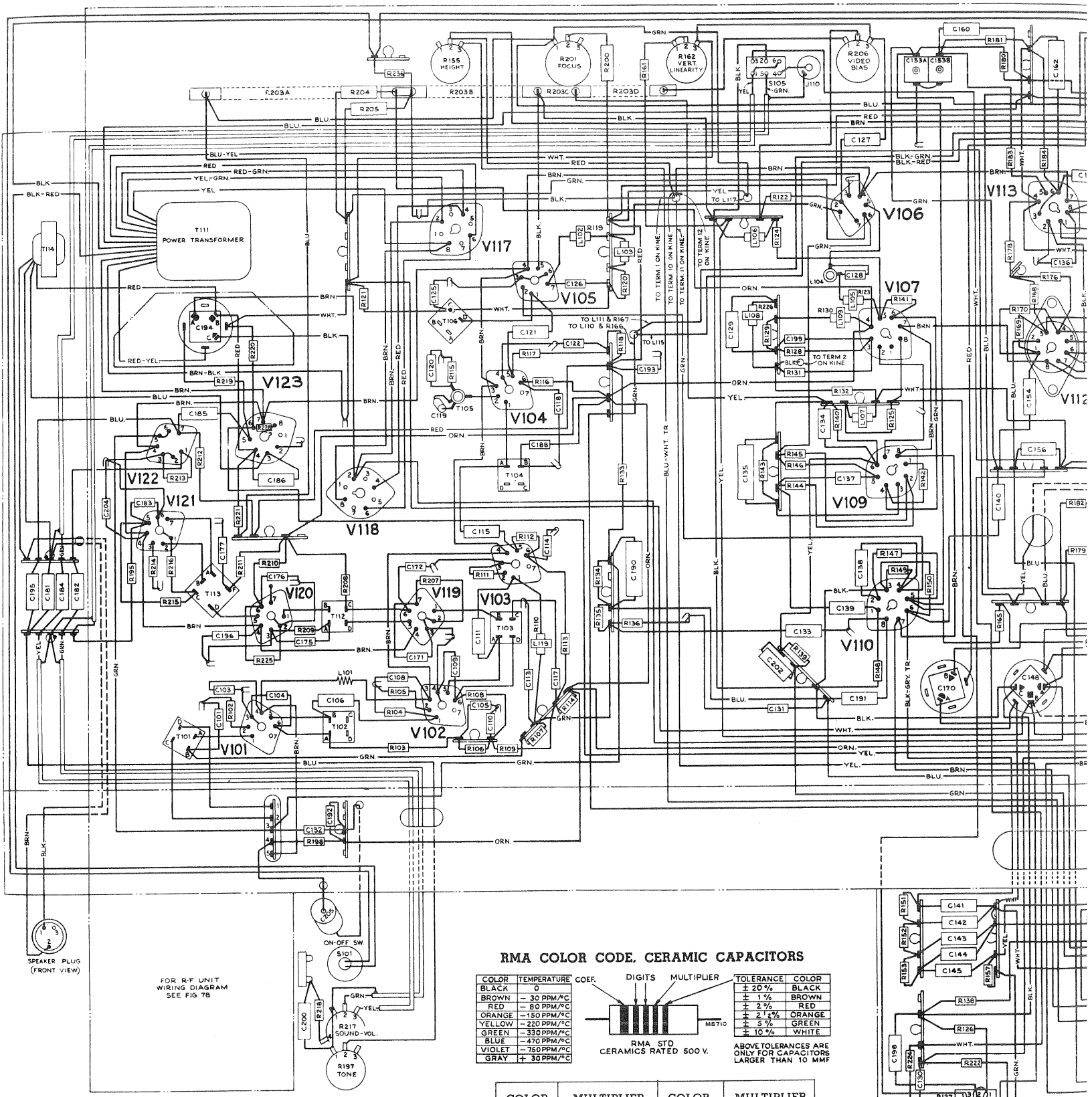
REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
73573	Transformer—Third pix I-F transformer (T103, C112)
73574	Transformer—Fourth pix I-F transformer (T104, C116)
73575	Transformer—Fifth pix I-F transformer (T106, C123, C124)
74144	Transformer—Vertical oscillator transformer (T107)
73568	Transformer—Vertical output transformer (T108)
73576	Transformer—Horizontal oscillator transformer (T109)
74145	Transformer—Horizontal output and hi-voltage transformer (T110)
74143	Transformer—Power transformer, 115 volt, 60 cycles (T111)
71424	Transformer—Sound I-F transformer (T112, C173, C174)
71427	Transformer—Sound discriminator transformer (T113, C178, C179, C180)
71419	Transformer—Audio output transformer (T114)
73577	Trap—4.5 mc video trap (L104, C128)
71778	Trap—Sound trap (T105, C119)
73476	Trap—I-F trap (L118, C189)
74141	Yoke—Deflection yoke (L110, L111, L114, L115, C169, R166, R167)
	SPEAKER ASSEMBLY
	92580-2W
	RL 105A3
31825	Cap—Dust cap
73912	Cone—Cone and voice coil assembly
5118	Plug—3 prong male plug for speaker
74169	Speaker—8" P.M. speaker complete with cone and voice coil, less plug
	MISCELLANEOUS
74158	Back—Cabinet back
72857	Board—"Antenna" board
71599	Bracket—Pilot lamp bracket for Models 8TC270 and 8TC271
13103	Cap—Pilot lamp jewel
73754	Catch—Bullet catch and strike (2 required) for Models 8TC270 and 8TC271
X1917	Cloth—Grille cloth for mahogany or walnut instruments for Model 8T270
X1918	Cloth—Grille cloth for toasted mahogany instruments for Model 8T270
74160	Connector—Anode connector (3 required)
74127	Cushion—Cushion strip for back of safety glass (4 required)
74116	Decal—Control panel decal for mahogany or walnut instruments
74117	Decal—Control panel decal for toasted mahogany instruments
71768	Decal—Trade mark decal (RCA Victor) for Model 8TC271
71984	Decal—Trade mark decal (RCA Victor) for Model 8TC270
73180	Emblem—"RCA Victor" emblem
73642	Escutcheon—Channel marker escutcheon for walnut or mahogany instruments
73740	Escutcheon—Channel marker escutcheon for toasted mahogany instruments

STOCK No.	DESCRIPTION
72113	Foot—Rubber foot (4 required) for Model 8T270
74306	Glass—Safety glass for Model 8TC271
74125	Glass—Safety glass for Model 8T270
74252	Glass—Safety glass for Model 8TC270
74308	Hinge—Door hinge (1 set) for Model 8TC271 (2 required)
73903	Hinge—Door hinge (1 set for 1 door) for Model 8T270
73224	Knob—Channel selector knob—dark—for walnut or mahogany instruments
73225	Knob—Channel selector knob — tan — for toasted mahogany instruments
73222	Knob—Fine tuning knob — dark — for walnut or mahogany instruments
73223	Knob—Fine tuning knob — tan — for toasted mahogany instruments
73228	Knob—Horizontal hold, picture control or volume control knob—dark—for walnut or mahogany instruments
73229	Knob—Horizontal hold, picture control or volume control knob—tan for toasted mahogany instruments
73226	Knob—Vertical hold, brightness control or tone control knob—dark—for walnut or mahogany instruments
73227	Knob—Vertical hold, brightness control or tone control knob—tan—for toasted mahogany instruments
11765	Lamp—Pilot lamp
74126	Mask—Kinescope mask
74123	Ornament—Front panel metal ornament for Model 8T270
74313	Ornament—Wood fibre ornament for front of cabinet for Model 8TC271
74111	Plate—Door pull back plate — R.H. — for Model 8TC271
74112	Plate—Door pull back plate — L.H. — for Model 8TC271
74115	Plate—Stud and plate including wing nut and spring for front panel (2 required) for 8TC270 and 8TC271
74162	Plate—Mounting plate for interlock switch
74124	Plate—Stud and plate including wing nut and spring for front panel (2 required) for Model 8T270
39153	Plug—4 prong male plug for antenna cable
74253	Pull—Door pull for R.H. door for Model 8TC270
74254	Pull—Door pull for L.H. door for Model 8TC270
73771	Pull—Door pull (2 required) for Model 8TC271
74307	Screw—No. 8-32 x 1/8 tremit head screw for door pulls for Model 8TC271
74171	Shield—Cellulose shield for kinescope
30330	Spring—Retaining spring for knobs
14270	Spring—Retaining spring for knobs
72845	Spring—Retaining spring for knobs
73643	Spring—Spring clip for channel marker escutcheon
72936	Stop—Door stop for Models 8TC270 and 8TC271
74161	Stud—Locating stud for cabinet back (2 required)
74159	Support—Moulded insulator supports for kinescope (4 required)

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

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS



RMA COLOR CODE, CERAMIC CAPACITORS

COLOR	TEMPERATURE COEF.
BLACK	0
BROWN	− 30 PPM/°C
RED	− 80 PPM/°C
ORANGE	−150 PPM/°C
YELLOW	−220 PPM/°C
GREEN	−330 PPM/°C
BLUE	−470 PPM/°C
VIOLET	−750 PPM/°C
GRAY	+ 30 PPM/°C

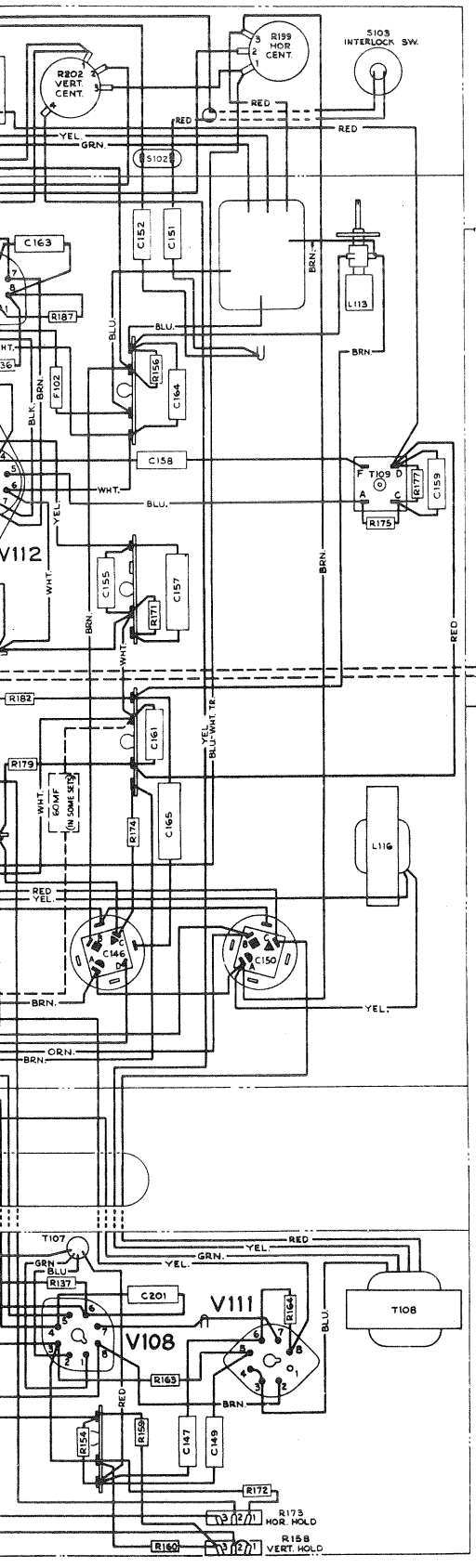
RMA STD CERAMICS RATED 500 V.

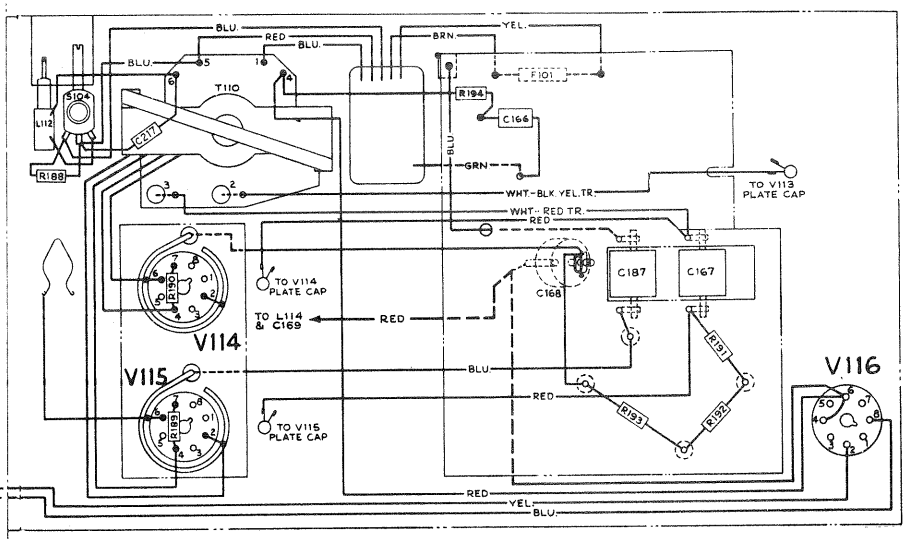
TOLERANCE	COLOR
± 20 %	BLACK
± 1 %	BROWN
± 2 %	RED
± 2 ½ %	ORANGE
± 5 %	GREEN
± 10 %	WHITE

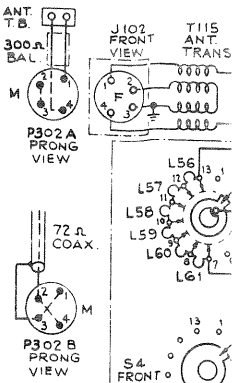
ABOVE TOLERANCES ARE ONLY FOR CAPACITORS LARGER THAN 10 MMF

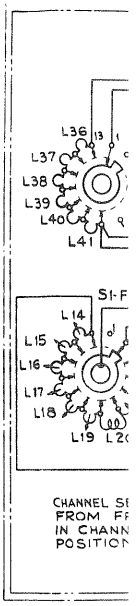
COLOR	MULTIPLIER	COLOR	MULTIPLIER
GRAY	.01	BROWN	10
WHITE	.1	RED	100
BLACK	1.	ORANGE	1,000

For digits, use digit column, page 26.









CHANNEL SE
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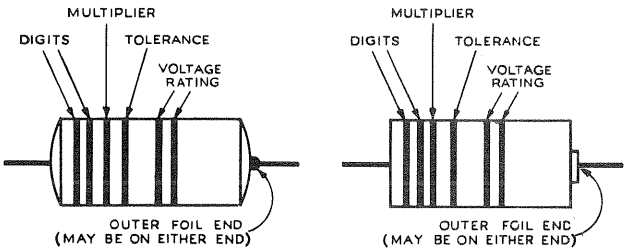
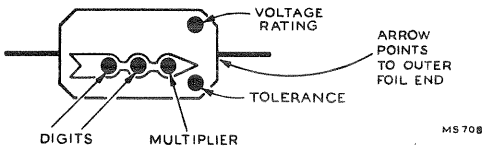
COLOR CODES, MOULDED PAPER CAPACITORS





CAPACITY VALUE IN MMF

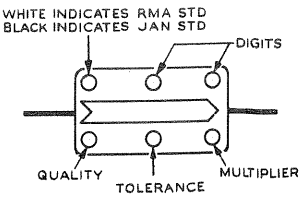
COLOR	DIGITS	MULTIPLIER
BLACK	0	1
BROWN	1	10
RED	2	100
ORANGE	3	1,000
YELLOW	4	10,000
GREEN	5	
BLUE	6	
VIOLET	7	
GRAY	8	
WHITE	9	

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

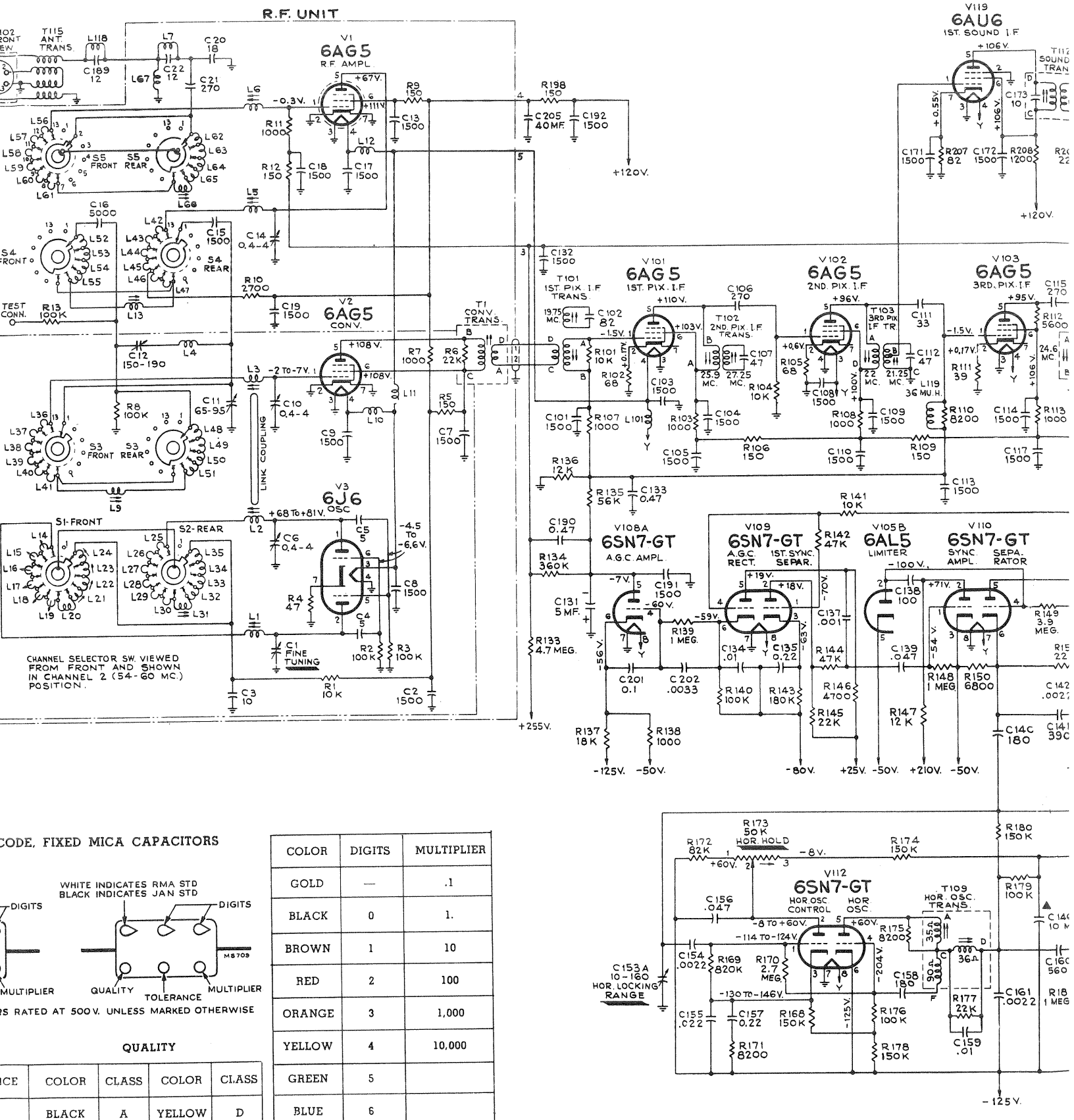


RMA FIXED MICA CAPACITORS RATED AT 5

TOLERANCE

COLOR	TOLERANCE	COLO
RED	±2%	BLACI
GREEN	±5%	BROWI
SILVER	±10%	RED
BLACK	±20%	ORANG

Figure 79—Chassis Wiring Diagram



CODE, FIXED MICA CAPACITORS

RS 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

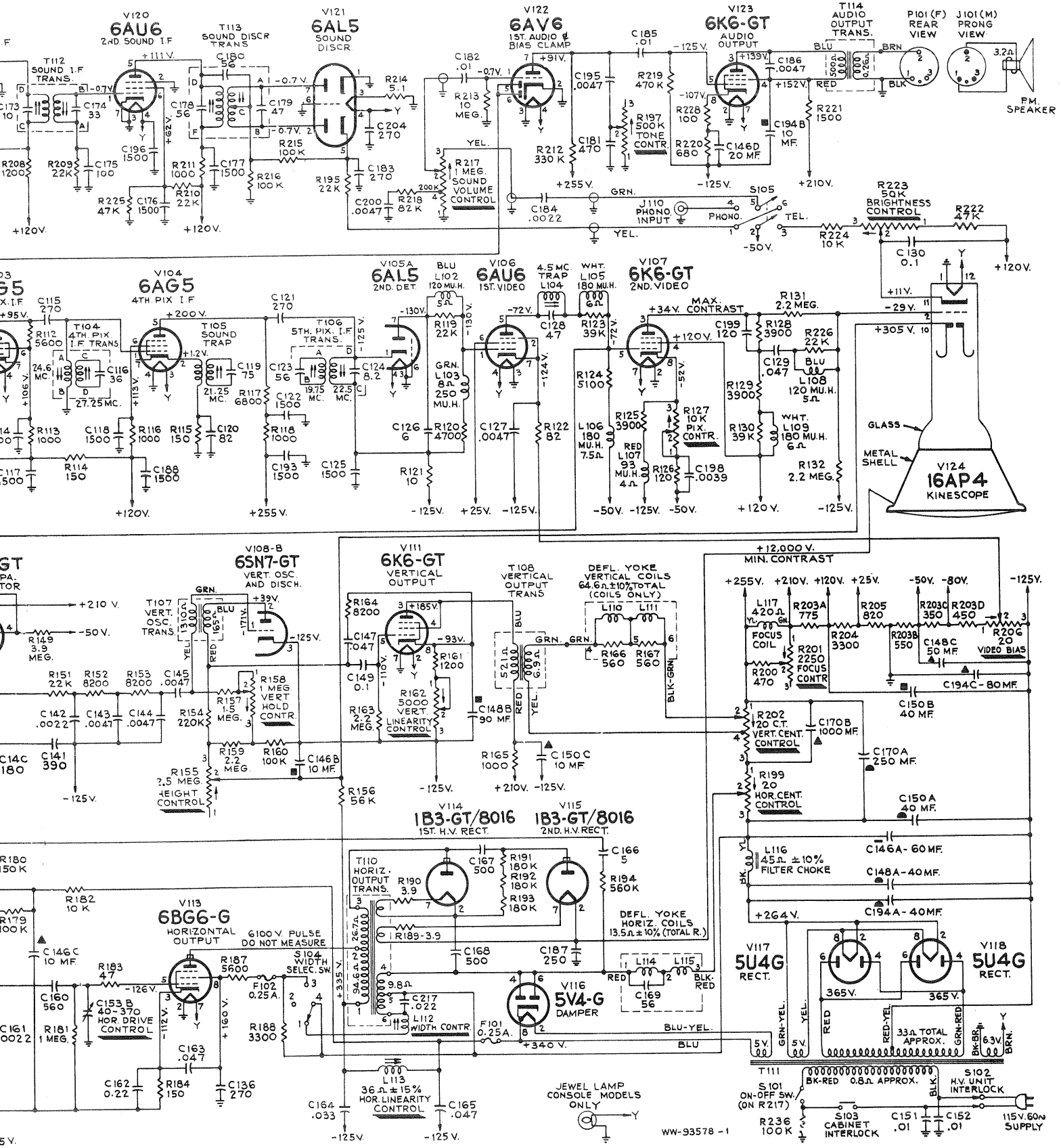
ICE	COLOR	CLASS	COLOR	CLASS
	BLACK	A	YELLOW	D
	BROWN	B	GRAY	I
	RED	C	WHITE	J
	ORANGE	D		

All resistance values in ohms. K = 1000.
All capacitance values less than 1 in MF and above 1 in MMF unless otherwise noted.
Coil resistance values less than 1 ohm are not shown.

Direction of arrows at controls clockwise rotation.

In some receivers, substitut caused changes in component codes, in electrolytic capacitor their lug identification marking

IAGRAM



at controls indicates

, substitutions have component lead color capacitor values and on markings.

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

In some receivers C148B was 10 MF and a 60 MF tubular condenser was connected in parallel with it.

In some receivers, R228 was omitted.
In some receivers, R236 was omitted.
In some receivers, F102 was omitted.
In some receivers, R236 was 220 K.
In some receivers, R102 was 39 ohms.
In some receivers, C127 was omitted.

In some receivers, the phono switch S105 and jack J110 were omitted. R195 was connected directly to C184. R224 was connected to -50 V.

Figure 80—Circuit Schematic Diagram