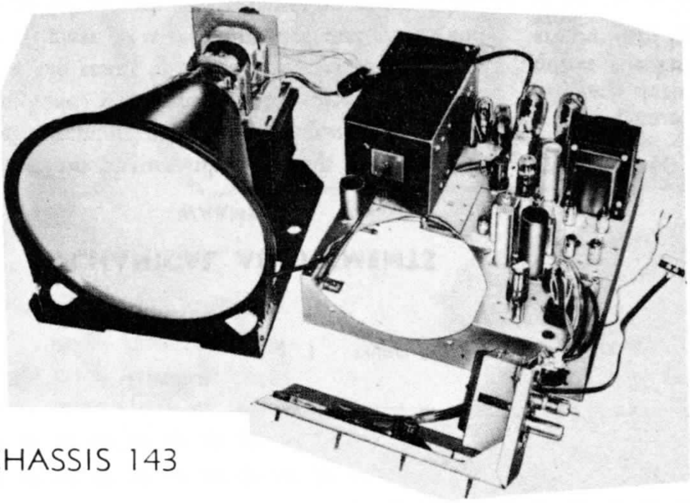
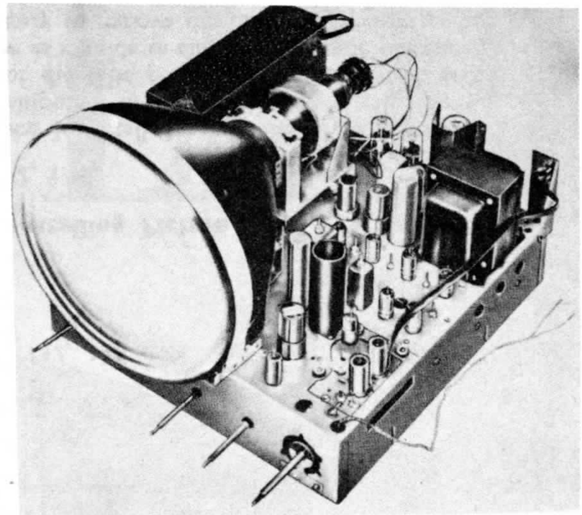
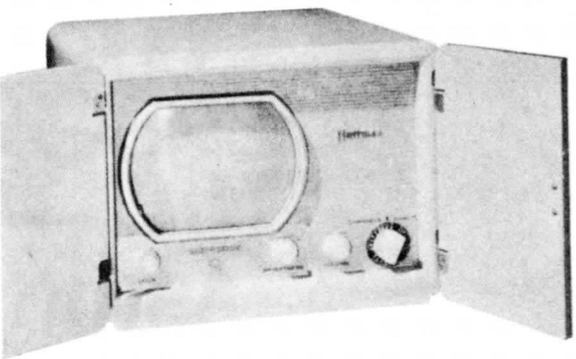


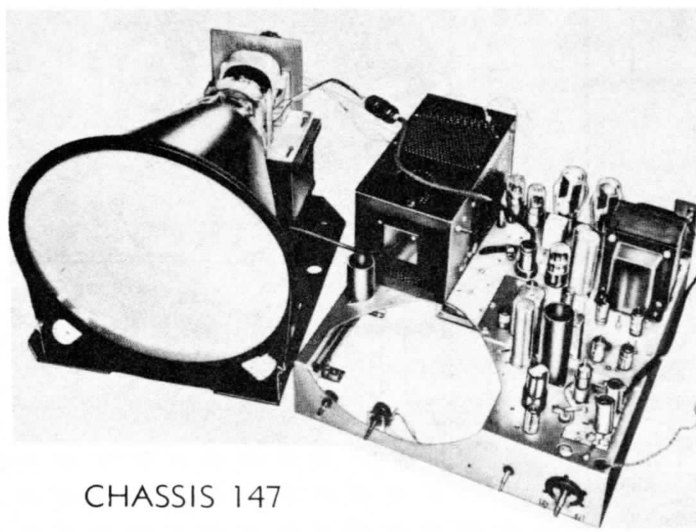
CHASSIS 143



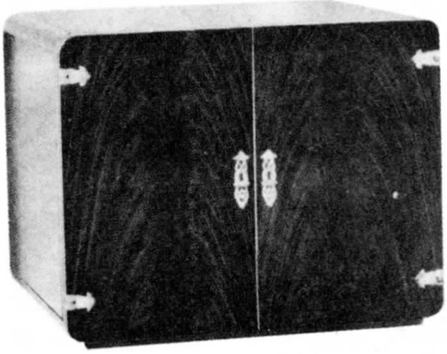
CHASSIS 140, 142 ,146



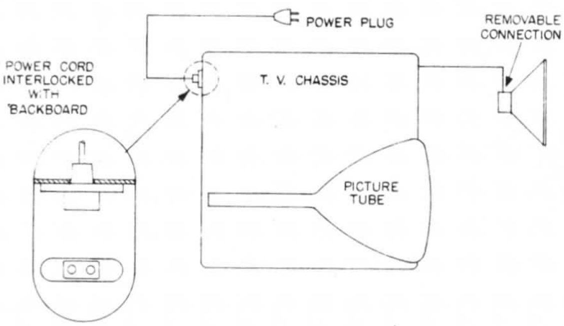
MODEL 610—DOORS OPEN



CHASSIS 147



MODEL 612—DOORS CLOSED



BLOCK DIAGRAM

MAJOR COMPONENTS

	Model 610	Model 612
TV Chassis	140	142
Speaker	6″ PM, Part #9062 Voice coil, 3.2 ohms at 400 cps	6″ PM, Part #9062
Cabinet	Part #7532	Part #7533
Escutcheon Frame	Part #2250	Part #2277
Filter Plate Glass	Part #733	Part #734
Picture Tube	10BP4, 10FP4	12KP4, 12LP4, 12QP4

Installation and service information on chassis 140 and 142 is given

ELECTRICAL AND MECHANICAL DATA

Range .... TV Channels 2 to 13

Intermediate Frequencies .... Video 26.1 Mc
Sound 21.6 Mc

Power Source

Chasis 140, 142 & 146—117 VAC, 60 cycles, 225 Watts
Chassis 143 & 147 —117 VAC, 60 cycles, 250 Watts

Output Impedance (Audio) .... 3.2 ohms at 400 cycles

Audio Power Output (Maximum) .... 3.5 Watts

Video Bandpass .... 4.0 Mc

Picture Tube Diameter

Chassis 140 —10″
Chassis 142 & 146—12″
Chassis 143 & 147—15″ or 16″

Chassis 140, 142, 143, 146 and 147 are all electrically and mechanically similar except for slight variations as follows:

Chassis 140 is a 24 tube receiver which supplies a second anode voltage for a 10″ picture tube and contains integral mounting provisions for a 10″ kinescope tube.

Chassis 142 is a 24 tube receiver which supplies a second anode voltage for a 12″ picture tube and contains integral mounting provisions for a 12″ kinescope tube. Electrically, Chassis 142 is identical to Chassis 140, except where a 12QP4 tube is used, in which case, changes are made to provide additional focusing current. (See Schematic Diagram.)

Chassis 143 is a 26 tube receiver which supplies a second anode voltage of approximately 12,000 volts and provides plug and cable connections for a separately mounted 15″ or 16″ tube, and for separately mounted tuning controls. The audio output transformer is designed for operation with a 12″ speaker.

Chassis 146 is a 24 tube receiver identical to Chassis 142 with the exception that the audio output transformer is designed to operate with a 12″ speaker.

Chassis 147 is a 26 tube receiver identical to Chassis 143, except that the tuning controls are integrally mounted on the chassis.

These chassis are all designed for use with a high gain Head end, such as RF-4 and *will not* operate with RF-1, RF-2 or RF-3.

TUBE COMPLEMENT

(Less Tuning Unit)

2	6AU6	Sound IF	V101, V102
1	6AL5	Ratio Detector	V103
1	6AV6	1st Audio	V104
1	6K6	Audio Output	V105
2	6AG5	Video IF	V106, V107
2	6AU6	Video IF	V108, V109
1	6AL5	Video Detector	V110
1	6AC7	Video Amplifier	V111
1	6SN7	D.C. Restorer, Sync Sep.	V112
1	6SN7	Sync Separator and Clipper	V113
1	6SN7	Vertical Osc. and Output	V114
1	6C4	A.F.C. Phase Splitter	V115
1	6AL5	A.F.C. Phase Comparator	V116
1	5U4G	Low Voltage Rectifier	V117
1	6SN7	Horizontal Oscillator	V118
1	6BG6	Horizontal Output	V119
1	1B3GT	High Voltage Rectifier	V120
1	6W4GT	Damping Diode	V121

Summary of Tube Complement

6AU6	4	6SN7GT	4	
6AL5	3	6C4	1	
6AV6	1	6BG6	1	
6K6	1	1B3GT	1	2*
6AG5	2	6W4GT	1	
6AC7	1	5U4G	1	2*

* Chassis 143 or 147

TUNING UNIT

1	6AG5	RF Amplifier
1	6J6	Osc. and Mixer

PICTURE TUBES

The following kinescope tubes may be used interchangeably in the respective chassis which employ 10, 12, or 16 inch tubes. Slight circuit variations for specific tubes are noted in the text.

10BP4
10FP4
12KP4
12LP4
12QP4
15AP4
16AP4

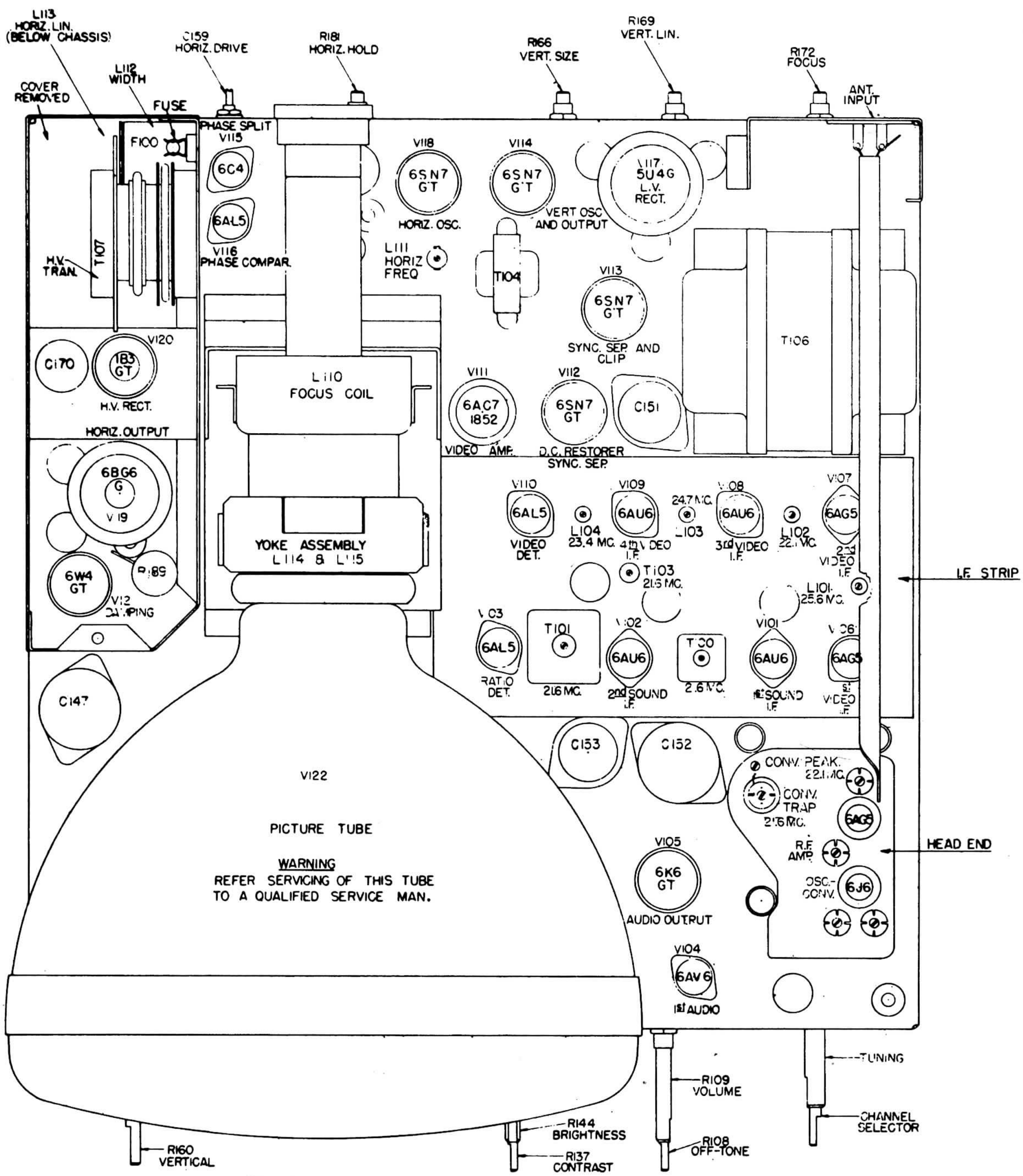


Fig. 1 TUBE LOCATIONS—CHASSIS 140, 142, 146

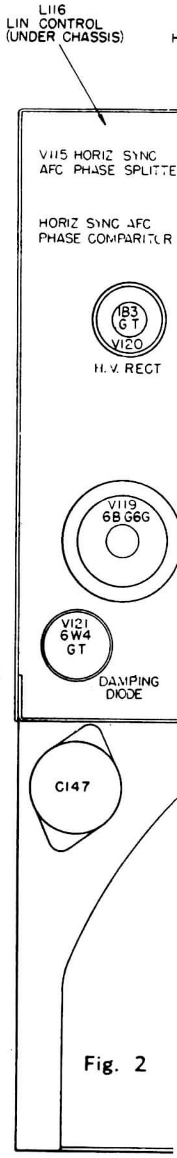


Fig. 2

MECHANICAL ADJUSTMENTS

WARNING

Television picture tubes contain an extremely high vacuum, and will collapse and shatter (implode) with considerable violence if broken. This can result in serious personal injury from flying glass. It is recommended that gloves and goggles be worn while handling these tubes.

Installing Picture Tube

Chassis 140, 142, 146.

The picture tube is installed at the factory and remains in place during shipment of the set. Initial installation requires checking of the tube position. The installation steps are outlined below as a guide in checking the tube placement. When it is necessary to remove the tube for service, reverse the instru

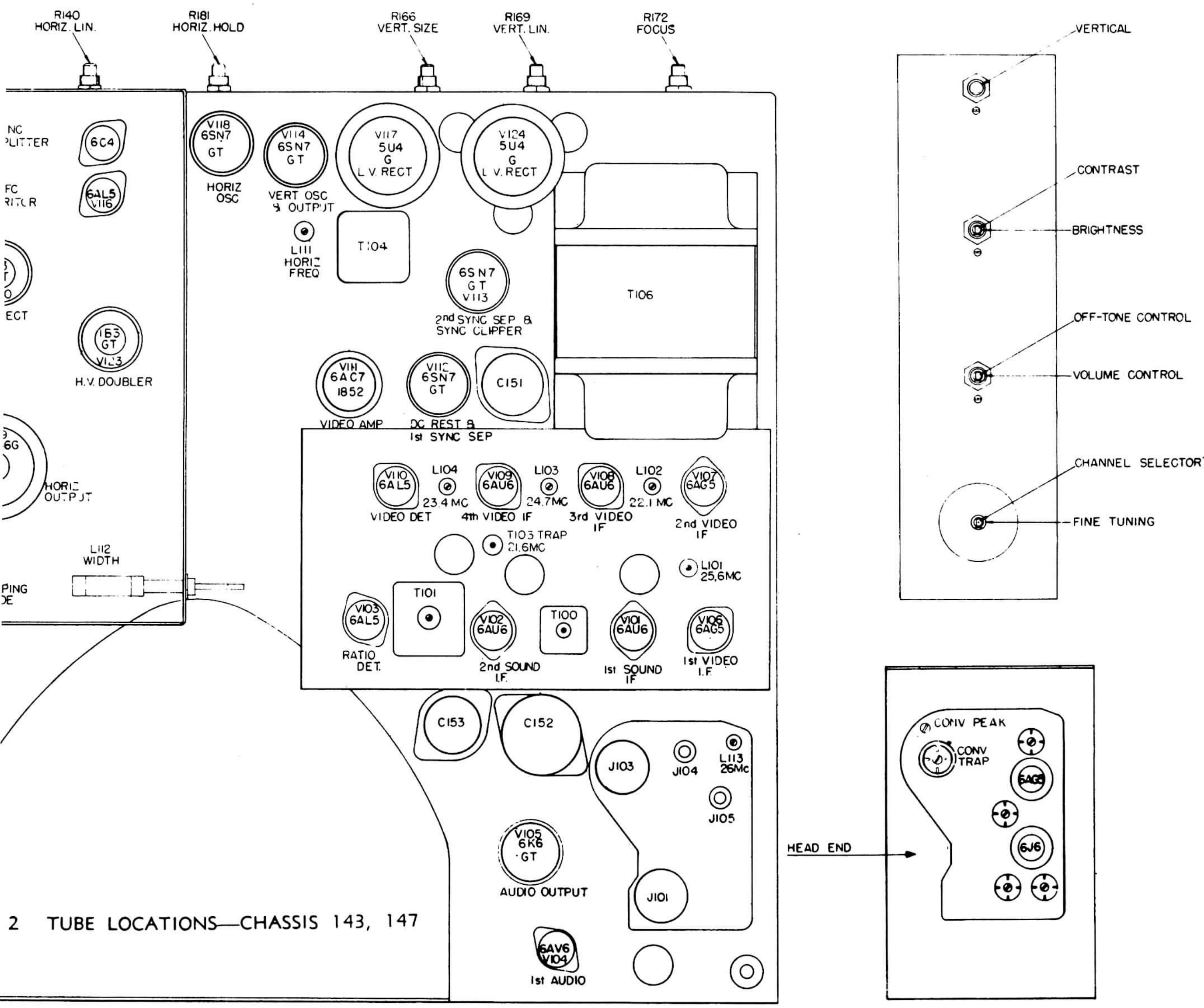
1—Loos

2—Caref cente this mate 142 1½"

3—Insta ing

4—With forw Lock to b top addi tube,

5—Wit ing It is in o



2 TUBE LOCATIONS—CHASSIS 143, 147

instructions of steps 3, 1 and 2.

Loosen all adjustments on the deflection yoke assembly.

Carefully slide the neck of the picture tube through the center of the deflection and focus coils. On Chassis 140, this should leave the face of the picture tube approximately flush with the front of the chassis. On Chassis 142 and 146 the face of the tube should be approximately 1½" forward of the chassis front.

Install the vinyl-chloride kinescope-holding strap, following the instructions on the side of the chassis.

With the strap in place, slide the deflection coil hood forward until the rubber pads support the tube cone. Lock the hood in this position temporarily and check to be sure that the axis of the tube is parallel with the top of the chassis. If not, it will be necessary to insert additional rubber padding under the front edges of the tube, in order to bring it to a horizontal position.

With the tube supported as in Step 4, check the centering of the tube neck in the deflection and focus coils. It is essential that the tube center properly in these coils in order to avoid shadows in the corners of the raster.

6—Loosen the deflection coil assembly adjustments, slide the chassis into the cabinet as far as it will go, then adjust the picture tube so that it nests into the recess in the cabinet front.

7—First slide the deflection coil hood forward to rest tightly against the picture tube cone, and then see that the coil itself is also seated tightly against the tube.

8—Be sure that at least ⅛" clearance is maintained between the focus and deflection coils, otherwise the picture centering adjustments will not function.

9—Set and tighten the deflection coil adjustments, bolt the chassis in place and install knobs.

10—Install the beam bender as follows:

a—Slide the beam bender over the neck of the tube with the arrow pointing toward the second anode cap on all tubes except the 12QP4, on which it should point forward and 180° away from the second anode cap.

b—Set the brightness control approximately midway in its range. Do not turn the brightness control to maximum at any time until the beam bender has been completely adjusted.

c—Rotate and slide the beam bender for *maximum* raster brilliance, advancing the brightness control slightly, if necessary to obtain a raster. *Do not* attempt to compensate for shadows in the corners of the raster with the beam bender, if such adjustment causes a sacrifice of raster brilliance. Such adjustments must be made with the deflection and focus coil settings.

d—If it is impossible to obtain a raster as outlined above, turn the set off and try another beam bender.

e—Make the final fine adjustment of the beam bender with the brightness control set for a raster brilliance slightly above normal and the focus control set for a sharp line structure. If this setting places the beam bender more than 1/4" from the internal flags on the tube gun, the beam bender magnet is probably weak and the bender should be replaced.

CAUTION

The above procedure must be carefully followed, or serious kinescope damage may result. A misadjusted beam bender causes the electron stream to strike the edge of the anode top disc and vaporize the metal of the disc. The gases thus released are very damaging to the internal coating of the tube screen, and may cause circular darkened areas similar to ion spots to appear on the screen, even though the ions are being properly trapped by the beam bender. It is possible to damage a tube in as little as 15 seconds if the beam bender is improperly set and the brilliance control is set at maximum.

f—After the final beam bender adjustment has been made, check the bender for tightness on the tube neck, and, if necessary, tape or wedge it in place.

g—Whenever a set is shipped, the beam bender adjustment must be rechecked as above.

Chassis 143 and147, 16" tube:

A. To remove tube:

1—Remove the 4 wing nuts marked "A" in Figure 3 below.

2—Remove the kinescope tube socket and disconnect the yoke and second anode cables. Remove the clamp holding the second anode cable to the cabinet.

3—Slide the tube mounting board back and out of the cabinet, raising the back edge sufficiently to allow the top of the tube to clear the rib at the top rear of the cabinet.

4—Remove the vinyl tube holding strap and the beam bender.

5—Loosen the four screws marked "B" in Figure 3, three full turns.

6—Lift the rim of the tube clear of the insulators, supporting the front edge of the yoke assembly at the same time. MORE THAN MODERATE STRAIN ON THE NECK OF THE TUBE MAY RESULT IN BREAKAGE OF THE TUBE AND INJURY FROM FLYING GLASS.

7—Slide the tube forward and out of the yoke assembly.

B. To reinstall tube:

1—Remove tube mounting board from the cabinet.

2—Loosen the four screws marked "B" in Figure 3 at least 3 full turns.

3—Slide the neck of the tube through the yoke until the metal cone of the tube strikes the insulators at the front of the tube mounting board.

4—Raise the front edge of the yoke assembly, raising the front of the tube at the same time.

5—Slide the tube into the yoke until the flaring portion of the tube seats against the deflection yoke. WARNING. DO NOT ATTEMPT TO FORCE THE TUBE INTO PLACE. A FEW SECONDS INVESTIGATION OF THE CAUSE OF AN OBSTRUCTION MAY PREVENT SERIOUS INJURY FROM A BROKEN TUBE.

6—Set the rim of the tube into the insulators at the front of the tube mounting board.

7—Reinstall the vinyl tube holding strap, following the instructions on the tube mounting board.

8—Reinstall the beam bender as outlined in Step 10 under Chassis 140, 142, and 146.

Chassis 143 and 147, 15" tube (indicated by the suffix "G" on the set model number, as 826G, 827G, etc.)

A. To remove tube:

1—Follow Steps 1 through 5 for removal of a 16" tube.

2—Slide the tube forward and out of the yoke.

B. To reinstall tube:

1—With the tube mounting board removed from the cabinet, carefully slide the neck of the tube through the yoke until the flaring portion seats against the deflection yoke mounting hood.

2—Reinstall the vinyl tube holding strap, following the instructions on the tube mounting base.

3— The focus coil adjustments should be checked as follows:

a—The spacing between the focus coil and the deflection coil should be approximately 1/4".

b—The kinescope neck should center in the hole in the focus coil when the tube is strapped in place. These adjustments should always be checked.

4—The Dumont 15AP4 glass kinescope tube does *not* require a beam bender. If any other type glass tube is used which does require a beam bender, it should be installed as outlined under Step 10 of the picture tube installation method for Chassis 140, 142 and 146.

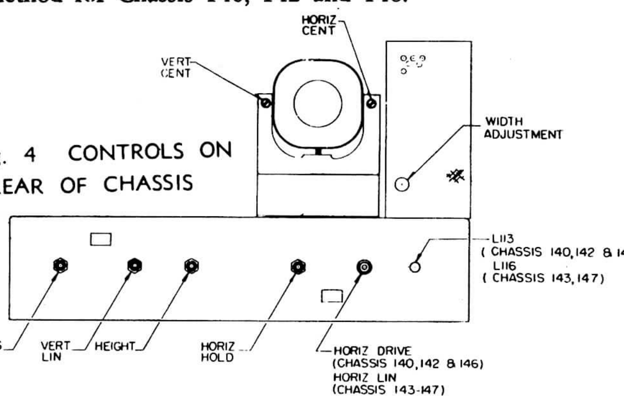


Fig. 4 CONTROLS ON REAR OF CHASSIS

RASTER CENTERING ADJUSTMENTS

Vertical and horizontal adjustment of the raster position within the picture mask is accomplished by means of the spring mounted screws on either side of the focus coil. Relative action of the two screws is indicated by the marking on the set backboard.

AGC ADJUSTMENT

Chassis 140 and 142 units below serial No. D903447 were shipped with a provision for optional AGC action on the Head End. In strong signal areas, it may be found that chassis of this type may produce a weak or "washed out" picture due to overloading of the first video IF stage. If this is the case, it will be necessary to provide AGC action on the Head End. This may be accomplished by moving the green and white lead from the Head End to the rear tie point on the AGC tie strip (See Figure 14).

NOTE

In making the following adjustments a source of television signal, such as that from a station, should be available, and the set should be allowed to operate for at least 15 minutes before adjustment.

HORIZONTAL SYNC ADJUSTMENT

Normally, all sets should hold horizontal sync throughout the entire range of the horizontal hold control. In any case, the sync error at either extreme of the horizontal hold control, when the channel selector is switched off channel and back again, should not produce more than 3 or 4 diagonal bands across the screen. If the sync error produces more than 3 or 4 bands, the horizontal frequency must be reset as follows:

1—Set the contrast control for a weak picture, approximately midway in its range.

2—Set the horizontal hold control to the extreme clockwise position.

3—Switch the channel selector off channel and back again.

4—If Step 3 throws the picture out of horizontal sync, L111 must be readjusted as follows:

a—Rotate the core in the direction which reduces the number of diagonal bands on the raster.

b—The direction of rotation under Step a. will usually be counter-clockwise. If it is clockwise, the adjustment must be carried beyond the sync pull-in range and back again, so that the pull-in setting is always approached from a counter-clockwise direction. During clockwise rotation, switch off channel and back several times to release sync lock-in.

5—Set the horizontal hold control to the extreme counter-clockwise position.

6—Switch the channel selector off channel and back again.

7—If the receiver will not pull in to horizontal sync with the horizontal hold set at the counter-clockwise extreme, it may be necessary to compromise the adjustment of L111 slightly; however, it is preferable to have best pull-in action at the extreme clockwise position.

8—Set the horizontal hold control by observing the top portion of the picture and setting the control at the point at which there is no distortion of the vertical lines in this region. This should be near the center of the range of the horizontal hold control.

9—If the above adjustments will not correct the horizontal sync pull-in, it is possible that L113 is misadjusted. The setting of L113 is normally fixed at from 60% to 100% of its maximum inductance and must be within this range for proper horizontal sync operation. This setting is indicated by a core stud extension of ½" or less (See Figure 4 for the location of L113).

10—Set L113 within its normal range, and readjust L111 as in step 4.

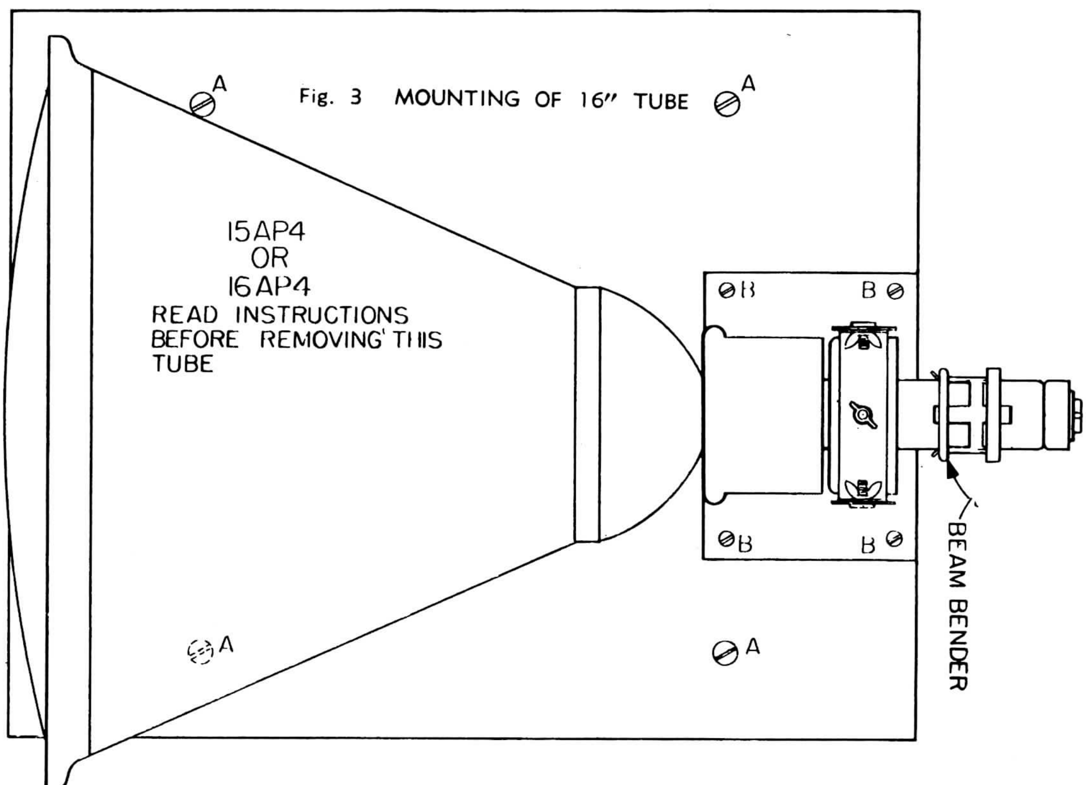


Fig. 3 MOUNTING OF 16" TUBE

USED ON MODEL
610
612
820
821
822
826
827
828
912
913

HORIZONTAL LINEARITY ADJUSTMENT

Chassis 140, 142, 146

Adjustment of the horizontal linearity on these chassis is most conveniently effected by means of C159, the horizontal drive condenser. Because of the nature of the horizontal AFC circuit used in this receiver, adjustments in the horizontal output circuit may affect the horizontal frequency (L111) and horizontal hold adjustments. Therefore, if it is necessary to readjust C159, it will also be necessary to recheck the horizontal sync adjustments (See above).

Chassis 143, 147

On these chassis, no horizontal drive control is provided. Instead, R140 is available on the rear chassis apron as an external adjustment or horizontal linearity. The range of adjustment of linearity is varied by means of the core in L116, which is accessible through the extreme right hand opening in the rear chassis apron by removing the set back-board (see Figure 4).

Normally, the factory setting of L116 should not require readjustment in the field and it should be possible to make all necessary horizontal linearity adjustments by means of R140. However, if this is not the case, it may be necessary to reset L116 as follows:

1—Turn the core stud until it extends about ¼" out of the coil.

2—Check the effect of adjustment of R140.

3—Turn the L116 core stud about 5 turns counter-clockwise.

4—Recheck the effect of R140.

5—Repeat Steps 3 and 4 until the optimum setting of L116 core is found.

As on Chassis 140, 142 and 146, readjustments of the horizontal linearity will require rechecking of the horizontal frequency (L111) and horizontal hold (R181) settings (See Horizontal Sync Adjustment).

WIDTH ADJUSTMENT

Adjustment of picture width is obtained by means of the core in L112, which is available through the hole in the lower left hand rear corner of the high voltage shield can (See Figure 4). Clockwise rotation of the core slug increases picture width, and counter-clockwise rotation decreases it.

On certain sets, it has been found difficult to obtain sufficient width, even with L112 core in the extreme clockwise position. In cases of this kind, the following remedies are recommended:

1—Replace V119, 6BG6G, Horizontal Output.

2—Disconnect one end of L112.

3—Add an .02, 600 V paper condenser across terminals 5 and 6 of T107, Horizontal Output Transformer.

VERTICAL LINEARITY AND HEIGHT ADJUSTMENTS

The vertical linearity and height adjustments on Chas 140, 142, 143, 146 and 147 are conventional potentiome adjustments located on the rear chassis apron. For a giv setting of the height control, counter-clockwise rotation of vertical linearity control compresses the top half of the p ture, and decreases the overall picture height. Clockw rotation of the height control increases the vertical size the picture uniformly.

TEST EQUIPMENT

For complete and thorough servicing of any TV recei the following test equipment is considered essential. In ticular, no alignment of a receiver should be underta without this equipment.

1—RF Sweep Generator meeting the following minim requirements:

a—Frequency Ranges

18 to 30 Mc, 10 Mc sweep width

For Head End alignment, the following is also ne sary.

50 to 90 Mc, 15 Mc sweep width

170 to 225 Mc, 15 sweep width

b—Output adjustable with at least 0.1 volt maxim

2—Cathode-ray Oscilloscope with a sensitivity of the o of 0.1V/inch.

3—Signal Generator to provide the following crystal trolled or crystal calibrated frequencies:

21.6 Mc Sound IF and Sound Traps

26.1 Mc Video IF Carrier

In addition, picture and sound RF carrier frequencies be provided as required for Head End alignment (See Ser Data No. 18).

4—DC Voltmeter 20,000 ohms per volt or vacuum tube with high voltage multiplier probe to permit reading 15 KV.

5—(Optional) Heterodyne Frequency Meter for Head alignment, providing crystal calibrated frequencies as quired

The picture tube in the television receiver may also be sidered a tool in the servicing of the receiver, since the dition of the information on the screen, together with o indications often serves to establish or at least localize trouble in a receiver in need of repair.

The following sections of this publication are devote data pertinent to the use of the above equipment in the se ing of Hoffman Chassis 140, 142, 143, 146 and 147.

OSCILLOSCOPE PATTERNS

Following is a tabulation of waveforms taken at var points in the circuit of Chassis 140, 142, 143, 146 and together with pertinent data on methods of connecting oscilloscope.

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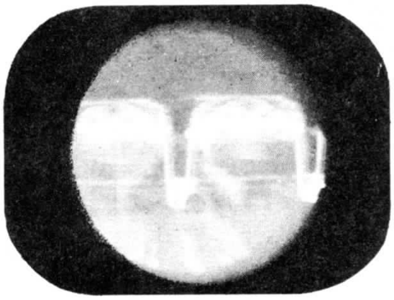
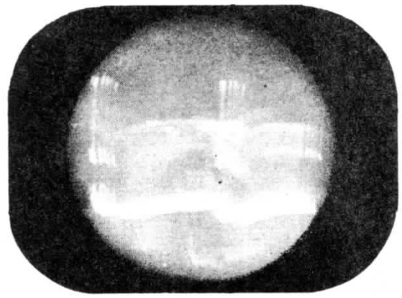
OSCILLOSCOPE PATTERNS



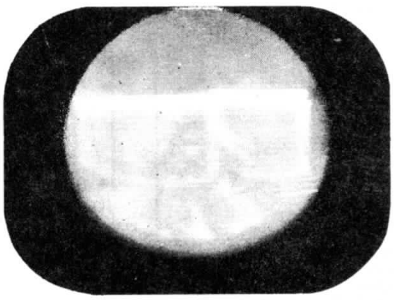
VIDEO AMPLIFIER OUTPUT

PIN 8 V111 O.H.F. 30 CYCLES



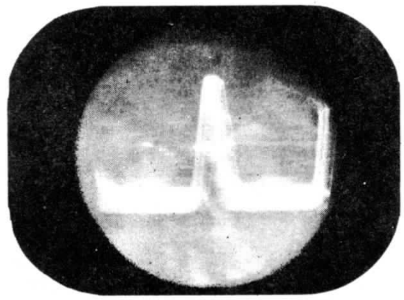
PARTIALLY INTEGRATED VERTICAL SYNC

JUNCTION R157, R158 O.H.F. 60 CYCLES.



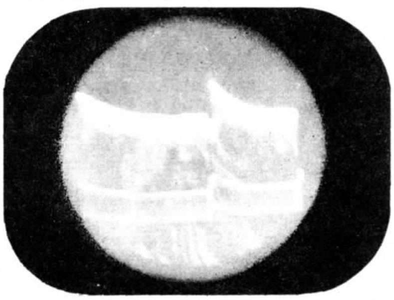
FIRST SYNC SEPARATOR OUTPUT

PIN 2 V112B O.H.F. 60 CYCLES



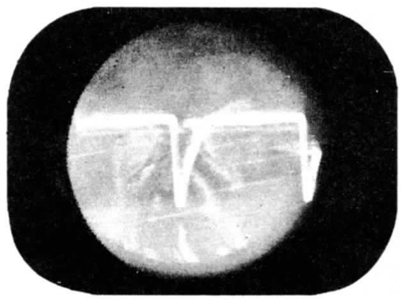
SINGLE HORIZONTAL SYNC PULSE

PIN 7 V115 O.H.F. 15,750 CYCLES



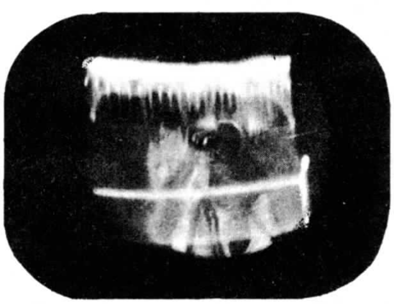
SECOND SYNC SEPARATOR OUTPUT

PIN 2 V113A O.H.F. 60 CYCLES



PHASE COMPARATOR PULSE

PINS 1 & 2 V116 O.H.F. 15,750 CYCLES



COMPOSITE HORIZONTAL SYNC

PIN 6 V115 O.H.F. 30 CYCLES

CONNECTIONS TO OSCILLOSCOPE MADE FROM INDICATED TUBE PINS TO GROUND. BLOCKING CONDENSER .005 mfd. USED WHEN B+ IS PRESENT.

O.H.F. OSCILLOSCOPE HORIZONTAL FREQUENCY, INDICATED FOR EACH WAVEFORM.

Fig. 5 WAVEFORMS OF SYNCHRONIZATION AND SWEEP PULSES

ALIGNMENT TABLE

Fig. 6

The detailed alignment procedure should be read before alignment by use of the table is attempte

Step No.	Connect Signal Generator To	Signal Generator Freq. Mc.	Connect Sweep Generator To	Sweep Generator Sweep-band	Connect Oscilloscope To	Connect Voltmeter To	Miscellaneous Connections and Instructions	Adjust	Refer To
				VIDEO IF AND SOUND TRAP ADJUSTMENT					
1	Pin 5 mixer stage. See Fig. 10	21.6	Not Used		Not Used	Pin 7, V110 See Fig. 11	−3V (battery) AGC	Conv. trap for min. on meter.	
2	"	21.6	"		"	"	"	T103 for min.	
3	"	22.1	"		"	"	See cautions in text.	Conv. video peaking for max. on meter.	
4	"	25.6	"		"	"	"	L101 for max.	
5	"	22.1	"		"	"	"	L102 for max.	
6	"	24.7	"		"	"	"	L103 for max.	
7	"	23.4	"		"	"	"	L104 for max.	
8	Mixer grid (loosely)		Pin 5 mixer stage. See Fig. 10	Center Freq. 24.1 No sweep	"	"	−3V (battery AGC	Sweep atten. for 2V on meter.	
9	"	26.1 22.3	"	4 Mc wide	Pin 7, V110 See Fig. 11	Remove	"	L101, L102, L103 & L104 as req.	Fig. 1
				SOUND IF AND DETECTOR ADJUSTMENT					
10	"	21.6	Pin 5 mixer stage. See Fig. 10	Center Freq. 21.6 300KC wide	Pin 5, V103 See Fig. 11	Not used	Disconnect C108	T100 & T101 (bottom)	Fig. 14
11	"	21.6	"	"	Junct. C107, R104. See Fig. 14	"	Reconnect C108	T101 (top) to center marker on "S" curve	Fig. 1
12	Repeat steps 1 and 2.								
	TUNING UNIT ADJUSTMENT								
13	Connect antenna to receiver through attenuator pad to provide weak signal.								

ALIGNMENT DATA

The detailed alignment procedure which follows is intended primarily as a discussion of the method used, precautions to be taken and the reasons for these precautions.

For more convenient use in actual alignment, Figure 6 presents the alignment data in tabular form. Although the data in Figure 6 is complete, its use in alignment should not be attempted until the detailed procedure following has been read.

ORDER OF ALIGNMENT

When a complete receiver alignment is necessary, it should be performed in the following order:

- Video IF Transformers (including Sound Traps)
- Sound IF Transformers
- Sound Detector
- Recheck Traps
- Head End
- Sensitivity Check

VIDEO IF AND SOUND TRAP ADJUSTMENT

Two methods of Video IF adjustment are presented in this section. The first or fixed frequency method is recommended for use only on sets which are known to be completely out of alignment, and must be followed by a retouching adjustment using the second or sweep method.

CHASSIS

	1	2
V101 6AU6	0	0
V102 6AU6	0	0
V103 6AL5	.19•	.19•
V104 6AV6	−.74•	0
V105 6K6	NC	6.2
V106 6AG5	−.75•	.60
V107 6AG5	−.61•	.68
V108 6AU6	0	0
V109 6AU6	0	0
V110 6AL5	0	−1.4•
V111 6AC7	0	6.2ac
V112 6SN7	−7[y]• .8[x]•	18
V113 6SN7	0	11
V114 6SN7	−79	5.8•
V115 6C4	123	NC
V116 6AL5	−74	−74
V117 5U4	NC	280
V118 6SN7	−75	40.5
V119 6BG6	NC	6.2ac
V121 6W4	NC	NC
	1	2
V122 KINE	0	12.5

All DC readings taken on 20,000 oh

All AC readings taken on 5,000 oh

•—Readings taken on vacuum tube

[w]—Voltages measured between pin

[x]—Brilliance and contrast controls

[y]—Brilliance at minimum, contrast

[z]—Brilliance at maximum, contrast

CAUTION

Since the Vide broad-band amp regenerative osc must be taken alignment.

Input and output de as outlined under Step

If sustained oscillati two or more of the tu quency. If such a conc to minimum inductanc

SOUND TRAP ADJ

1—Connect a resistive the 6J6 mixer tube ing cautions:

All leads must be ke

SSIS 140, 142, 146 SOCKET VOLTAGE CHART

Fig. 7

2	3	4	5	6	7	8
0	0	6.2ac	122	122	.88	—
0	0	6.2ac	122	122	.90	—
.19•	6.2ac	0	.41•	0	0	—
0	0	6.2ac	NC	NC	65	—
6.2	238	250	0	NC	0	16.8
.60	6.2ac	0	119	126	.53	—
.68	6.2ac	0	84	124	.69	—
0	0	6.2ac	89	118	.72	—
0	0	6.2ac	71	118	.72	—
-1.4•	0	6.2ac	0^{x} 1.3^{y}	0	.55•	—
.2ac	12.2^{x} 1.6^{y}	9.8^{x}• 0^{y}	12.2^{x} 1.6^{y}	127	0	234
18	0	−36^{x} 0^{z}	129	−62^{x} +7.6^{z}	0	6.2ac
11	1.5^{x}• 2.3^{y}•	−2.7•	116	0	6.2ac	0
5.8•	−74	−73	189	−72	6.2ac	0
NC	0	6.2ac	123	0	6.6	—
−74	6.2ac	0	−70	0	−82	—
280	NC	265ac	NC	265ac	NC	280
40.5	−66	−66•	156	−66	0	6.2ac
.2ac	−67	NC	−81	NC	0	162
NC	320	NC	260	NC	320	6.0ac^{w}
2	**10**	**11**	**12**	**H.V. ANODE**		
12.5	257	8.2	6.2ac	7.5KV^{x}		

00 ohm per volt meter except as noted.
00 ohm per volt meter.
tube volt meter.
n pins 7 and 8.
itrols at minimum.
itrast at maximum.
trast at minimum.

'ideo IF stages are all single tuned amplifiers, they are quite subject to oscillation, and several precautions cen to avoid this condition during

: decoupling networks must always be used iteps 1 and 4 below.
lation occurs, it will usually be found that e tuned circuits are set near the same fre- ondition does occur, adjust L103 and L104 :ance.

.DJUSTMENT

ive pad as shown in Figure 9 to pin 5 of ibe in the Head End, observing the follow-

: kept as short as possible.

All resistors used must be of the composition type. Since many low value resistors are wire wound, with a composition case, it is advisable to break and examine a sample resistor of each size to be used.

All input ground connections must be made to the center shield plate in the Head End (See Figure 10).

2—Connect the output of the signal generator to the network input.

3—Connect the positive terminal of a 3 V battery to chassis, and the negative terminal to the AGC bus (Junction R122, R118, R119, and C118).

4—Connect a decoupling network as shown in Figure 11 to pin 7 of the Video Detector (V110, 6AL5) again using only a composition resistor.

5—Connect the voltmeter from point "X" of the decoupling network to ground.

6—Set the signal generator to 21.6 Mc, and adjust the attenuator to give a reading of approximately .5 volt on the voltmeter.

7—Tune the converter trap (top adjustment on the converter transformer) and cathode trap (T103) for *minimum* reading on the voltmeter, increasing generator output as necessary to maintain meter deflection at approximately .5 volt.

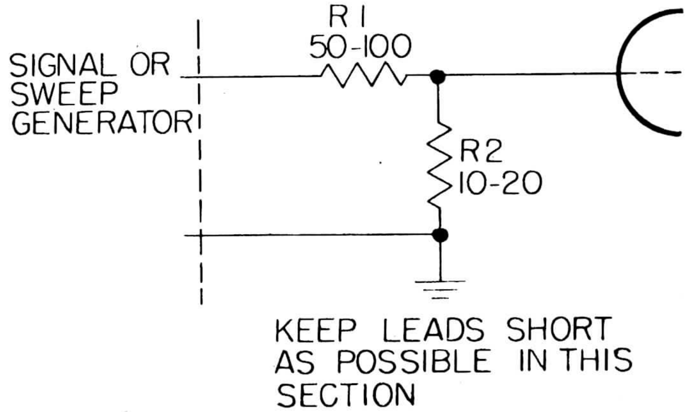


Fig. 9 INPUT ISOLATION PAD

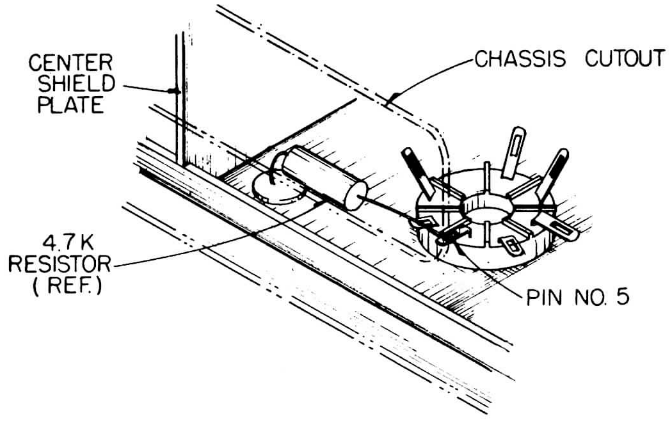


Fig. 10 LOCATION OF PIN No. 5 ON TUNING UNIT

CHASSIS 143, 147 SOCKET VOLTAGE CHART

Fig. 8

	1	2	3	4	5	6	7	8
V101 6AU6	0	0	0	6.2ac	130	130	.95	—
V102 6AU6	0	0	0	6.2ac	130	130	.8	—
V103 6AL5	.2*	.5*	6.2ac	0	.55*	0	0	—
V104 6AV6	—1.0*	0	0	6.2ac	NC	NC	68	—
V105 6K6	NC	6.2ac	240	252	0	NC	0	17
V106 6AG5	—1.8*	.8	6.2ac	0	123	130	.8	—
V107 6AG5	—.75*	.75	6.2ac	0	95	130	.75	—
V108 6AU6	0	0	0	6.2ac	92	125	.82	—
V109 6AU6	0	0	0	6.2ac	76	128	.6	—
V110 6AL5	0	—.9*	0	6.2ac	0^{X} 1.3^{Y}	0	.6*	—
V111 6AC7	0	6.2ac	11.2^{X} 1.5^{Y}	10.2^{X}* 0^{Y}	11.2^{X} 1.5^{Y}	140	0	248
V112 6SN7	—7^{Y}* .8^{X}* ^{U}	21	0	—56^{X} 0^{Z}	129	—53^{X} 8.0^{Z}	0	6.2ac
V113 6SN7	0	14.5	1.5^{X}* 2.3^{Y}* ^{U}	—2.7^{U}*	105	0	6.2ac	0
V114 6SN7	—117	6.3*	—98	—90	254	—86	6.2ac	0
V115 6C4	128	NC	0	6.2ac	128	0	7.0	—
V116 6AL5	—97	—97	6.2ac	0	—90	0	—100	—
V117 5U4	NC	297	NC	385ac^{V}	NC	385ac^{V}	NC	297
V118 6SN7	—102	40.5	—87	—98*	165	—87	0	6.2ac
V119 6BG6	NC	6.2ac	—88	NC	—117	NC	0	200
V121 6W4	NC	NC	350	NC	275	NC	350	6.1ac^{W}
V124 5U4	NC	297	NC	385ac^{V}	NC	385ac^{V}	NC	297

	1	2	10	11	12	H.V. ANODE	
V122 KINE	0	—56^{X} 8.0^{Z}	270	11^{X}	6.2ac	13KV^{X}	

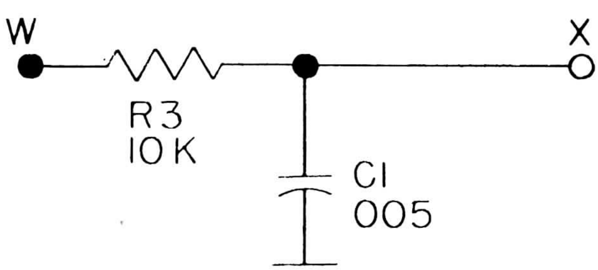


Fig. 11 DECOUPLING NETWORK

IF ALIGNMENT, METHOD I

With the signal generator and voltmeter connected as above, set the signal generator to each of the following frequencies and peak the specified adjustments for maximum indication on the voltmeter. (The signal generator attenuator should be set to give a maximum meter reading of approximately 1 V.)

22.1 Mc	Converter video peaking adj. (small, single tuned coil on Head End, immediately beside converter transformer, see Figures 1 & 2)
25.6 Mc	L101
22.1 Mc	L102
24.7 Mc	L103
23.4 Mc	L104

All DC readings
All AC reading
*—Readings tak
^{U}—Sync voltage
^{V}—Measured to
^{W}—Voltages me
^{X}—Brilliance ar
^{Y}—Brilliance at
^{Z}—Brilliance at

IF ALIGN

1—Connect tube in type de
2—Connect
3—Set the 3 above
4—Turn o center 24 Mc.
5—Adjust reading
6—Loosely mixer s pend or by the inserted vide su the sign to use input n used to but the
7—Set the signal
8—Adjust 12 as a
9—Repeat
10—Referri it may b the add Thus th correct and res approxi must be

SOU

1—Connec Alignm
2—Connec Figure
3—Discon
4—Connec the isol
5—Loosely sweep Method
6—Turn
7—Adjust near 2
8—Set the
9—Set the 3 V or
10—Set th
11—Adjus produc 13, wi

readings taken on 20,000 ohm per volt meter except as noted.
readings taken on 5,000 ohm per volt meter.
dings taken on vacuum tube volt meter.
c voltages vary with signal. These values for general guidance only.
sured to transformer center tap.
tages measured between pins 7 and 8.
lliance and contrast controls at minimum.
lliance at minimum, contrast at maximum.
liance at maximum, contrast at minimum.

ALIGNMENT, METHOD II

—Connect the sweep generator to pin 5 of the 6J6 mixer tube in the Head End, through an input filter of the type described under Step 1 above.

—Connect the voltmeter and oscilloscope as in Step 5 above.

—Set the AGC voltage at −3 volts as described in Step 3 above.

—Turn off the sweep in the sweep generator and adjust center frequency for maximum voltmeter reading near 24 Mc.

—Adjust the sweep generator attenuator for a voltmeter reading of 2 volts.

—Loosely couple the signal (marker) generator to the mixer stage. The exact method of coupling used will depend on the output impedance and signal level produced by the signal generator. In some cases an insulated wire, inserted between the mixer tube and its shield will provide sufficient coupling when connected to the output of the signal generator. In other cases it may be necessary to use direct resistive coupling to the sweep generator input network. In any case sufficient coupling must be used to provide good readable markers on the oscilloscope, but the coupling must not "pull" or detune the mixer stage.

—Set the sweep generator sweep width at 10.0 Mc, and the signal generator markers at 26.1 Mc and 22.3 Mc.

—Adjust pass band characteristics using the curve in Figure 12 as a guide.

—Repeat Steps 4, 5 and 8.

—Referring to the composite IF curve shown in Figure 12, it may be seen that the overall IF response is a function of the additive effect of the individual stagger-tuned coils. Thus the particular coil or coils requiring adjustment to correct errors in the overall response curve may be selected and reset. After final adjustment, the curve shape must approximate that shown in Figure 12C and the markers must be within the ranges specified.

SOUND IF AND DETECTOR ADJUSTMENT

—Connect the sweep generator as in Step 1 under Video IF Alignment, Method II.

—Connect point "W" of the isolation network shown in Figure 11 to pin 5, V103.

—Disconnect one end of C108.

—Connect the oscilloscope and voltmeter to point "X" of the isolation network.

—Loosely couple the signal (marker) generator to the sweep input as in Step 7 under Video IF Alignment, Method II.

—Turn off the sweep on the sweep generator.

—Adjust the sweep generator for maximum meter reading near 21.6 Mc.

—Set the signal (marker) generator at 21.6 Mc.

—Set the sweep generator attenuator to give a reading of 3 V on the voltmeter.

0—Set the sweep width at approximately 1 Mc.

1—Adjust T100 top, T100 bottom and T101 bottom to produce a response curve similar to that shown in Figure 13, with the 21.6 Mc marker located as shown.

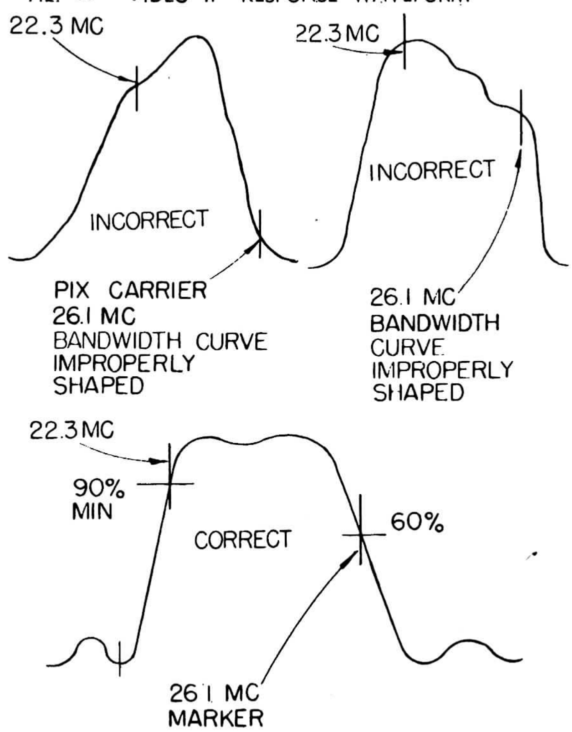
12—Move point "W" of the isolation network (Figure 11) to the junction of C107, R104 and R107. Leave the oscilloscope connected to point "X", but remove the voltmeter.

13—Reconnect C108.

14—Adjust T101 top to locate the 21.6 Mc marker in the center of the discriminator "S" curve as shown in Figure 13. Some dissymetry in the non-linear portions of the "S" curve will probably appear, due to AGC action. Do not attempt to correct this dissymetry with the T101 top adjustment.

15—Recheck the Sound Trap Adjustments and repeat Steps 2 through 10 (above).

Fig. 12 VIDEO IF RESPONSE WAVEFORM



SENSITIVITY CHECK

As an overall check of receiver performance, the relative sensitivity of the receiver may be compared to that of another receiver of the same model, by observing comparative performance of the two sets on a weak signal input. If convenient, it is suggested that this sensitivity check be performed on all sets which have been completely realigned as a final overall measure of the performance of the receiver. Other information relative to band pass, sync operation, linearity, etc. may be checked by observing the test pattern of a station known to be good in all respects.

Fig. 13 SOUND IF AND DETECTOR RESPONSE

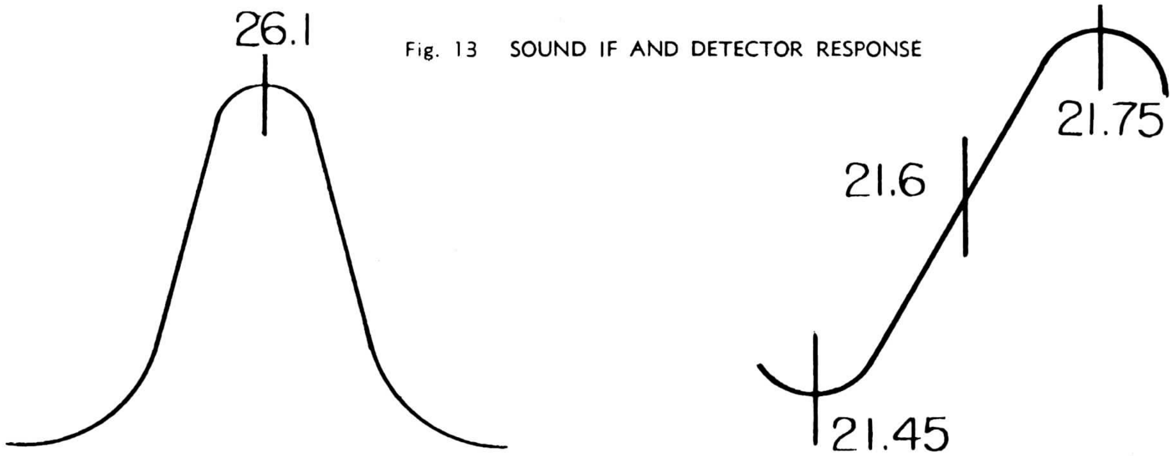
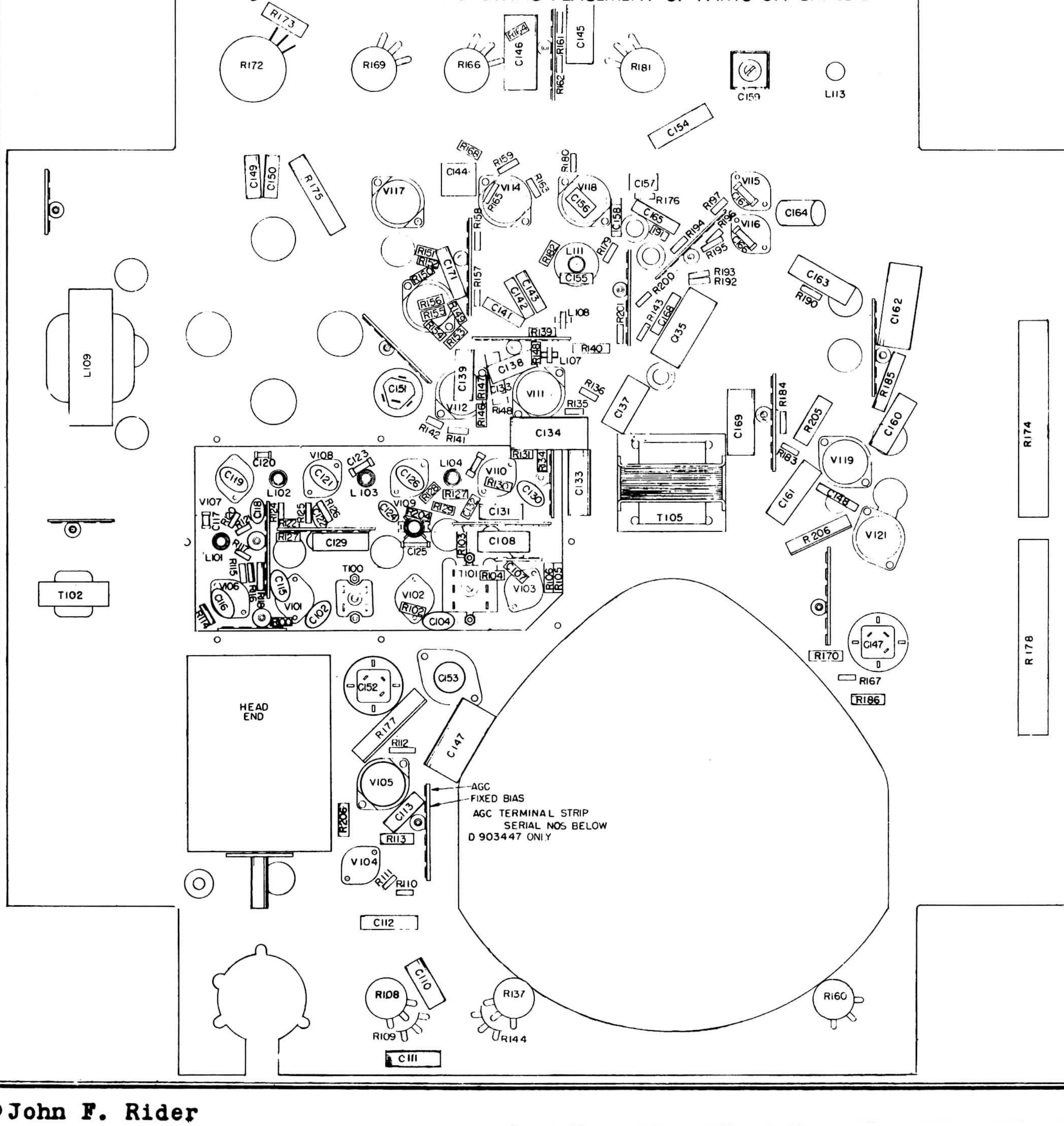


Fig. 14 BOTTOM VIEW SHOWING PLACEMENT OF PARTS ON CHASSIS



The grid of V101, 1st sound IF is connected to a tap (Terminal B) on the new 21.6 mc. trap, part of T107 Hoffman Part No. 5296, instead of to tuning unit. Reference should be made on the 140, 142, 143, 146 and 147 chassis.

ALIGNMENT DATA

The alignment procedure outlined may be followed exactly, except that where reference was made to the converter sound trap on the tuning unit, those adjustments will be made on the top slug of T107. It is now absolutely necessary to check alignment with a sweep generator and scope to obtain the desired video IF response after spot adjustment on the individual stagger tuned IF frequencies.

Figure 1 is an abbreviated schematic diagram showing the sound and video IF circuits with the new circuit changes.

REASON FOR MODIFICATION

Investigation has been made of several localized cases of distorted sound on the Hoffman table models, 610 and 612, and consolette models 820, 821, 822, 826, 827 and 828. It was found that multipath effects in these locations were causing random amplitude modulations of the signal and resulting in distorted audio output. Most cases were characterized by critical FINE TUNING adjustment, inasmuch as it is necessary to have the sound ratio detector exactly zeroed to obtain maximum AM rejection, and least distortion.

ADVANTAGES OF MODIFIED CIRCUIT

The changes considerably reduce the response of the ratio detector to AM components in the signal, thereby giving better AM rejection and reducing multipath distortion.

Greater audio recovery from the IF signal gives more audio output.

The response to ignition and other noises is decreased.

CIRCUIT CHANGES

To modify the ratio detector, the following circuit and parts changes were made.

Old Part	New Part	Difference
1000 Mmf (#4025)	30 Mmf (#4043)	C107 changed to new value
T101 (#5305)	T101 (#5305-1)	Primary to secondary coupling reduced
White wire from R107 to junction R104-C107	White wire from R107 to terminal "B" T101	Wiring change

The capacitor and wiring changes are made on all chassis after Serial No. F 904866. The new T101 will be installed later on all production chassis. The serial number at which the change occurs will be published at that time.

FIELD CHANGES

Whenever T101 is replaced for any reason, it is desirable to replace the transformer with the new type (#5305-1) and make the wiring and capacitor changes. It is possible to effect a partial improvement of AM rejection in present sets by making the capacitor and wiring changes.

Realignment of the ratio detector transformer is necessary when any of the changes are made.

ALIGNMENT DATA

A preliminary method may be followed for field alignment.

a. Tune in a TV signal for best picture. This is best adjusted by tuning for minimum 4.5 mc beat which shows up as a grainy appearance, particularly in the vertical resolution wedges.

b. Tune top slug of T101 for clearest sound. Tune both directions until distortion appears, then adjust midway between these points.

c. Tune bottom slug of T101 for maximum sound amplitude and best quality.

The normal alignment method using a sweep generator and scope is outlined

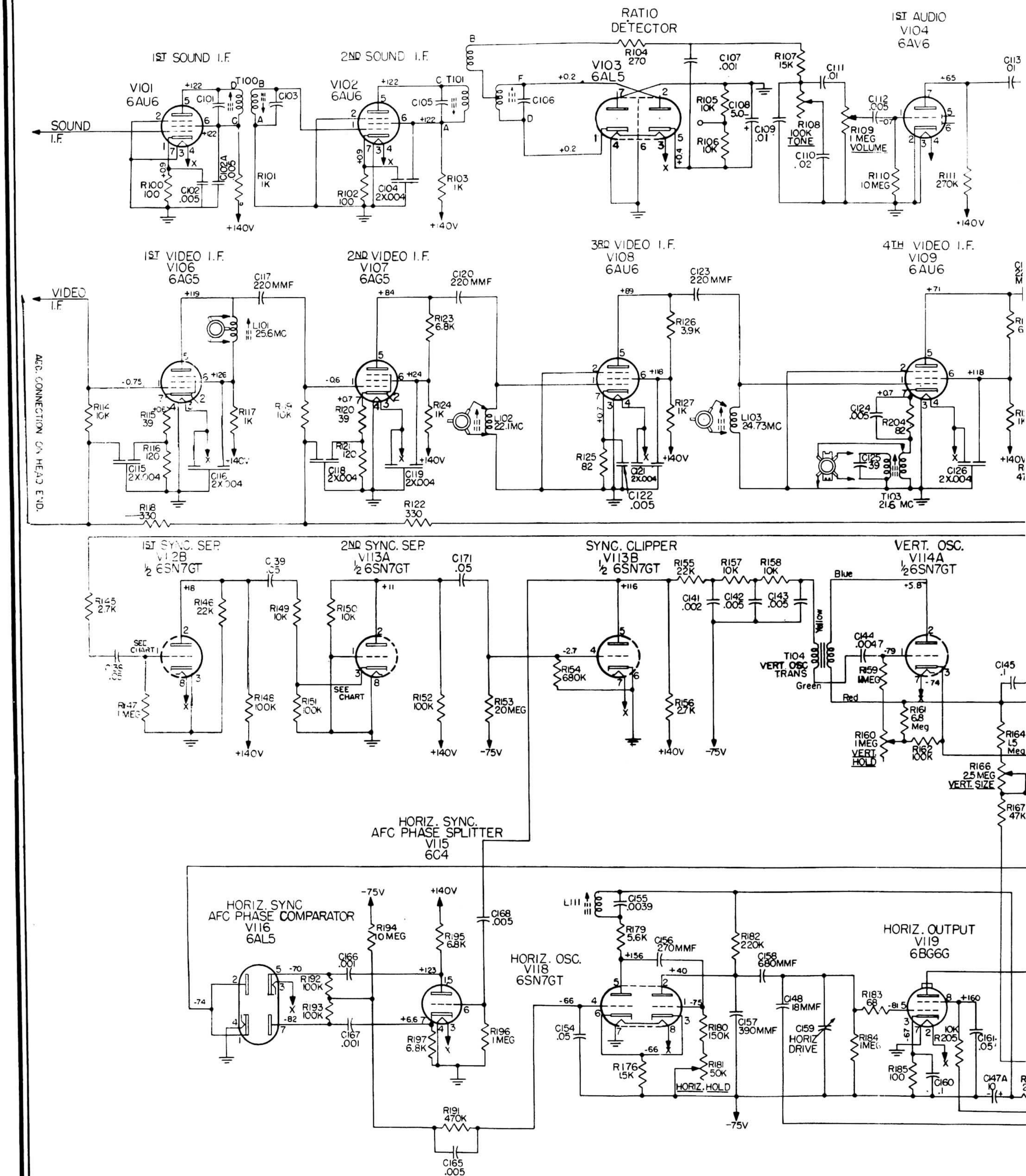
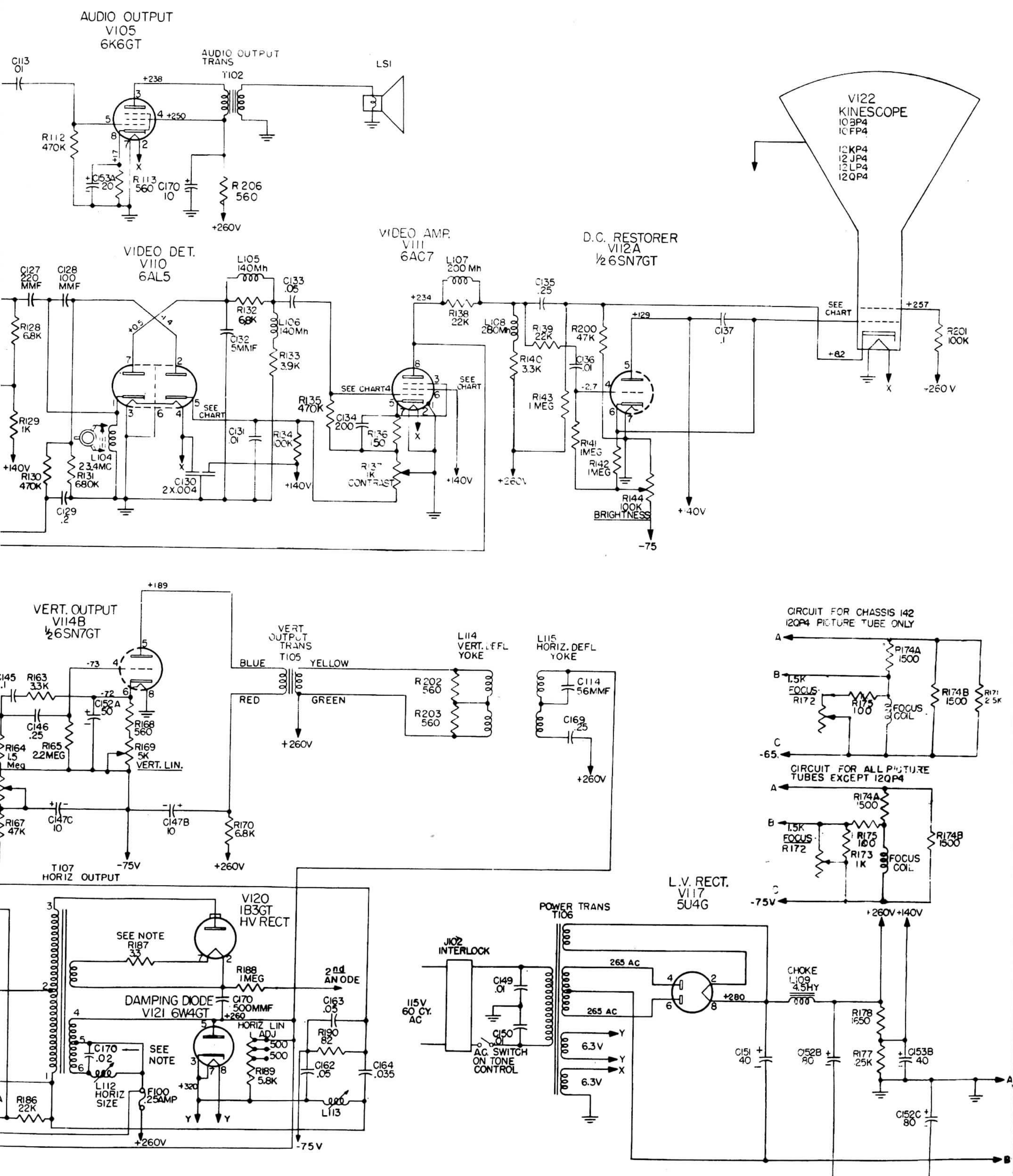


Fig. 15 SCHEMATIC DIAGRAM—



NOTE
1. R187 IS USED ONLY WITH RCA HORIZ. OUTPUT TRANS.
2. ALL COILS SHOWN FROM BOTTOM OF CHASSIS.
3. C170 USED ON CHASSIS 142 ONLY

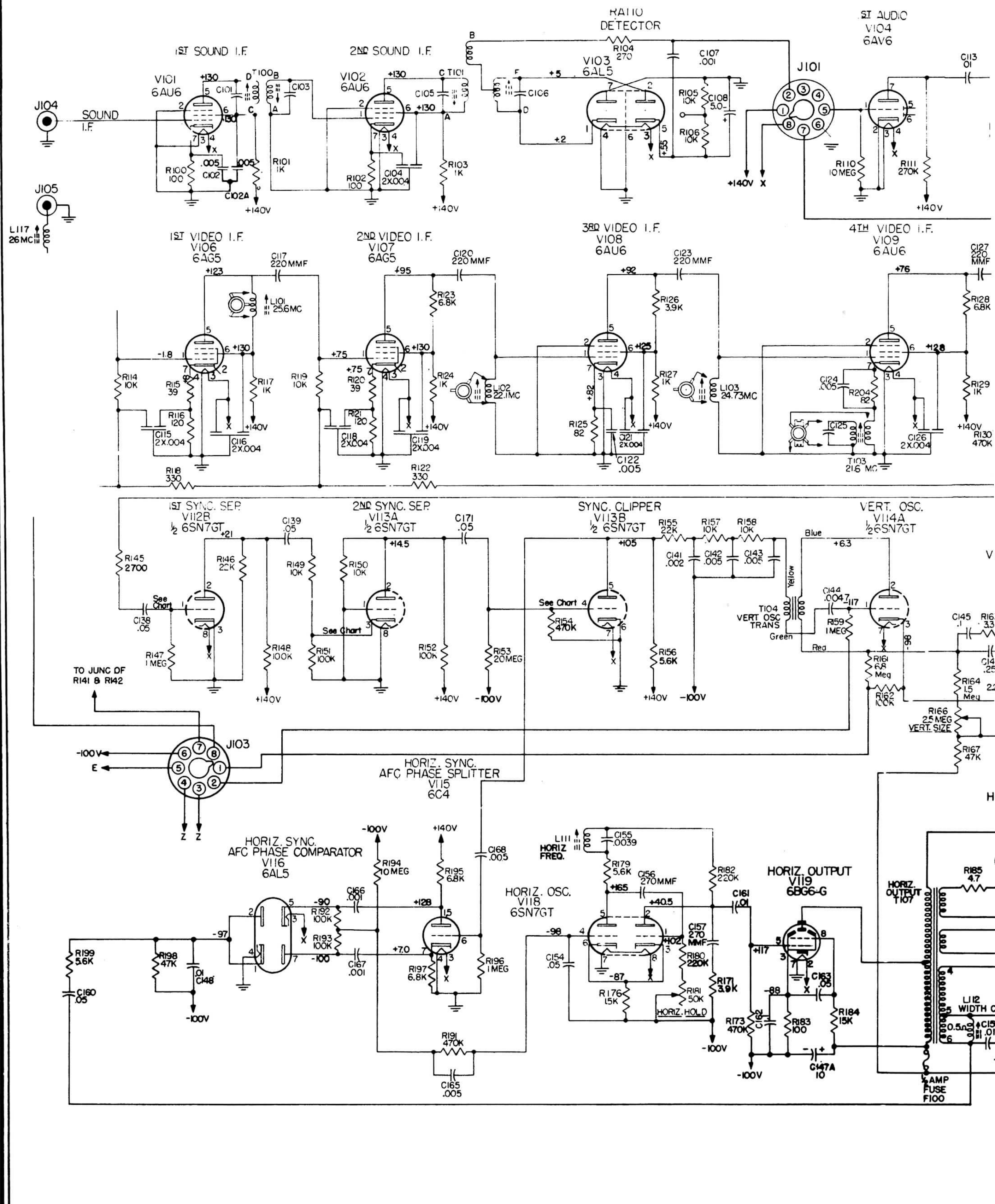
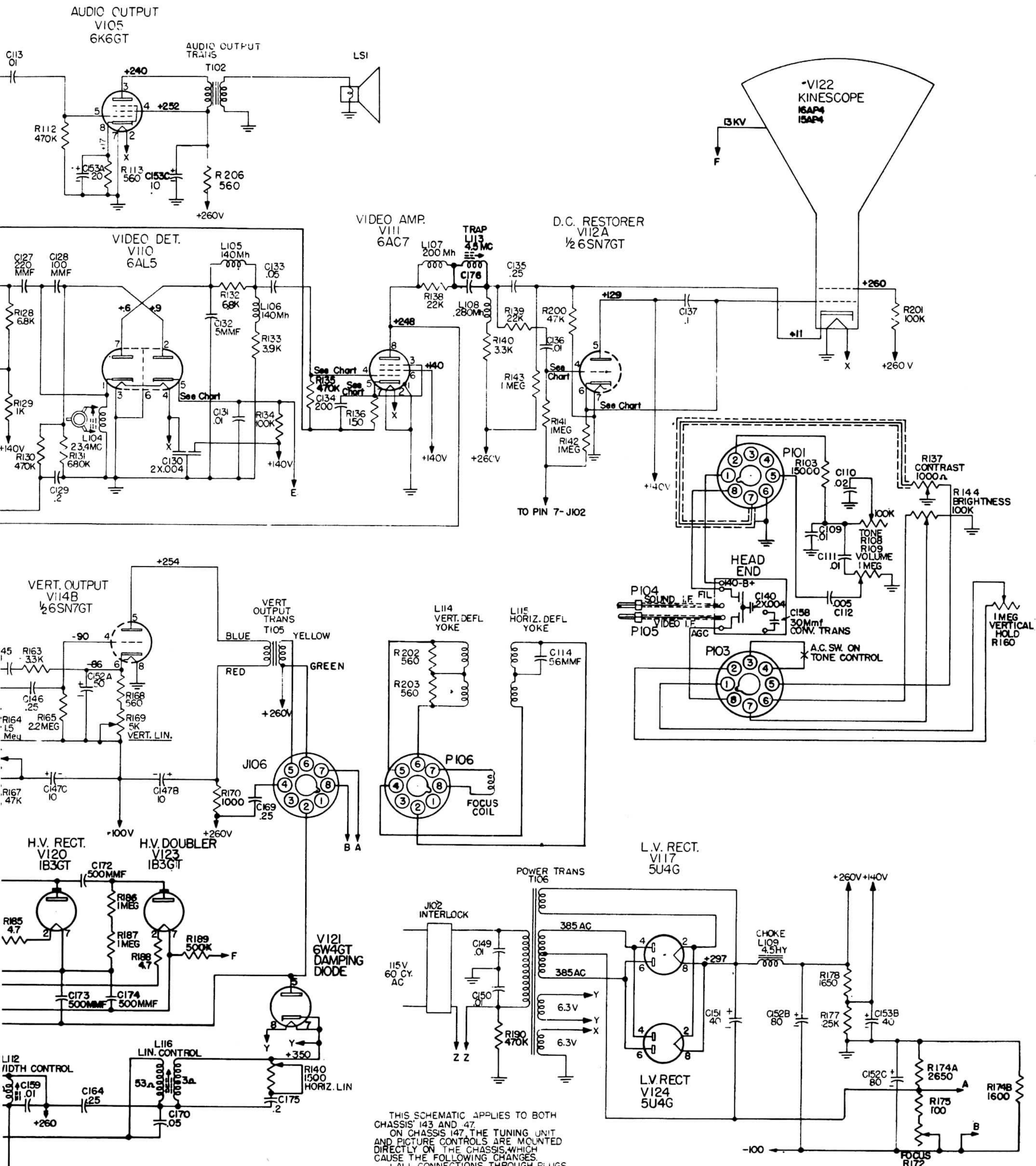


Fig. 17 SCHEMATIC DIAGRAM—



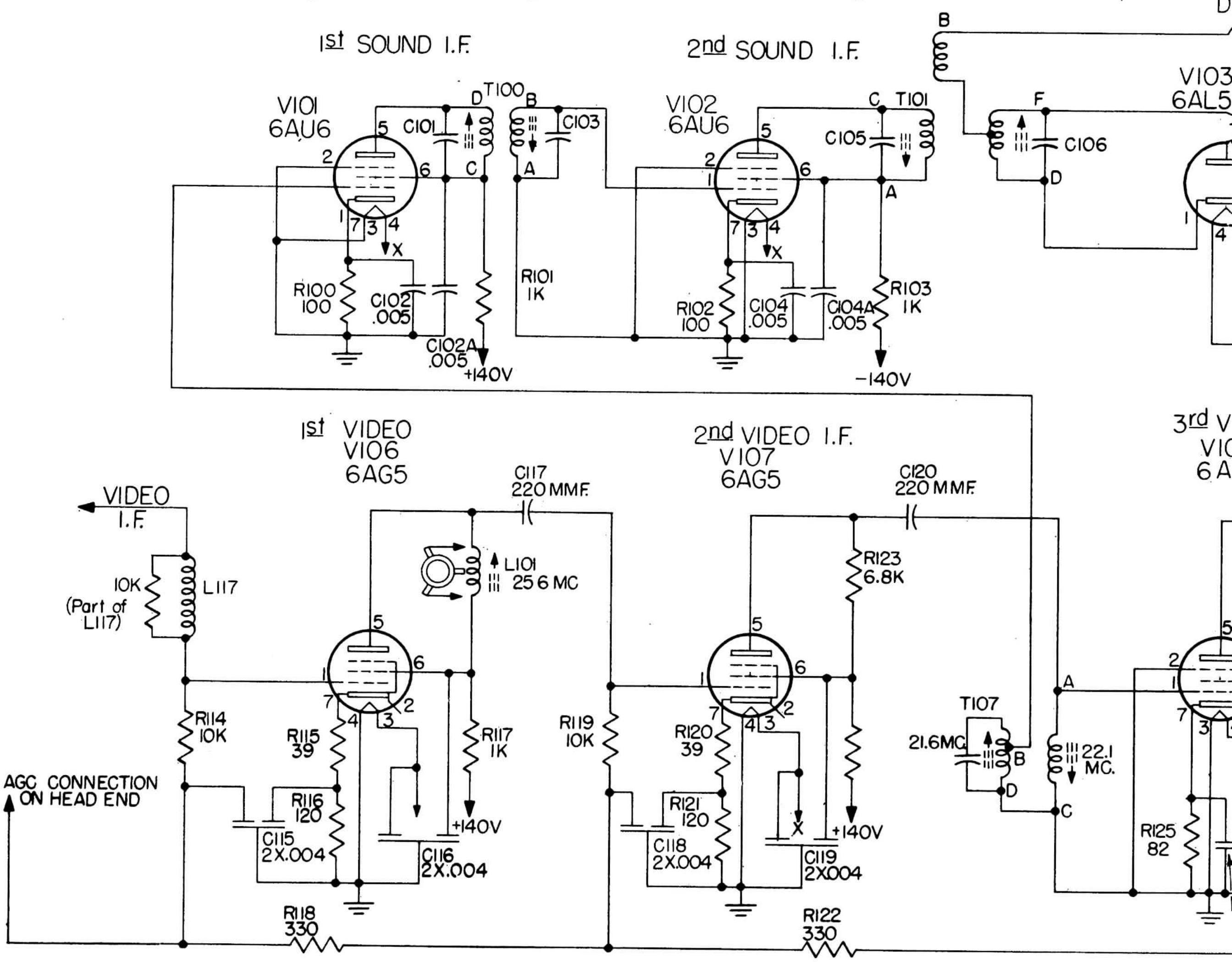
ALL COILS SHOWN FROM BOTTOM OF CHASSIS.

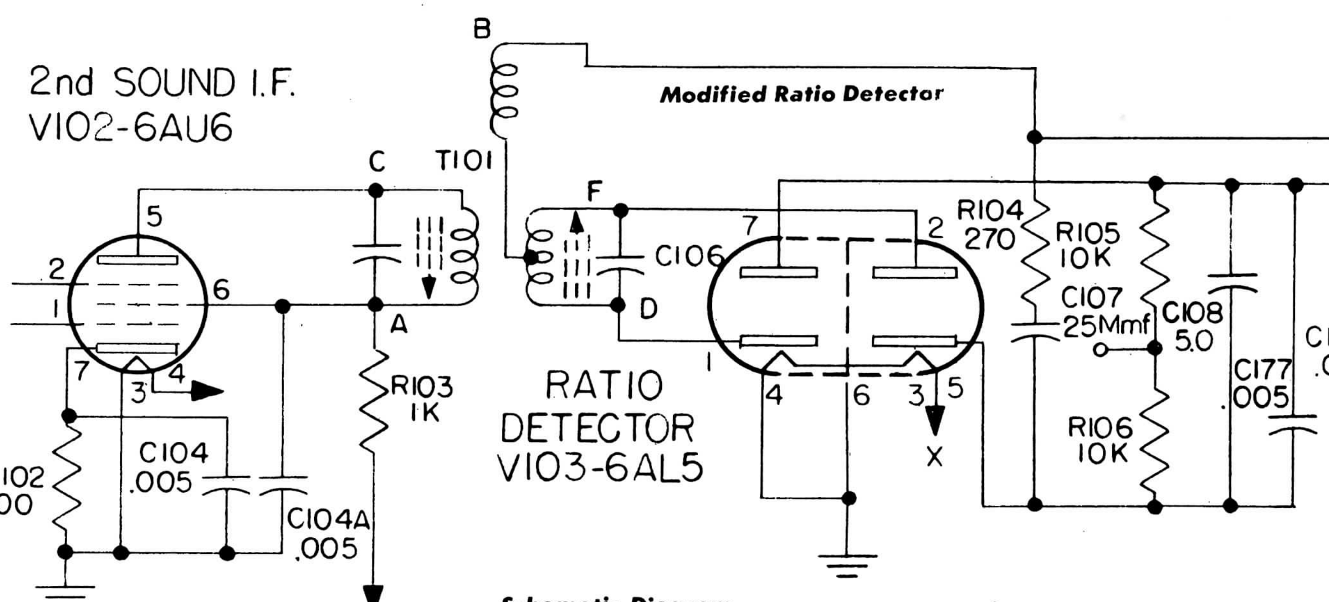
THIS SCHEMATIC APPLIES TO BOTH CHASSIS 143 AND 47.

ON CHASSIS 147 THE TUNING UNIT AND PICTURE CONTROLS ARE MOUNTED DIRECTLY ON THE CHASSIS, WHICH CAUSE THE FOLLOWING CHANGES.

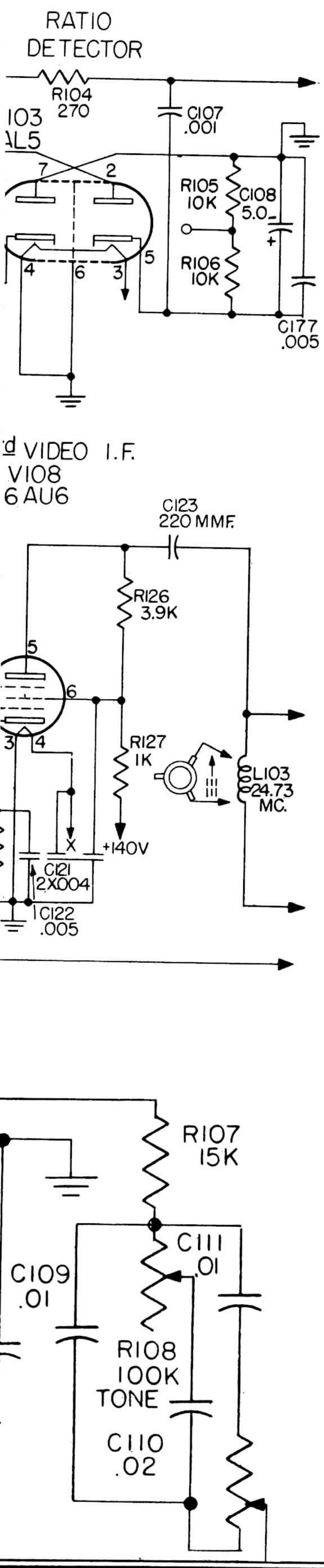
1. ALL CONNECTIONS THROUGH PLUGS AND JACKS 101, 103, 104 AND 105 ARE MADE DIRECTLY, AND THE PLUGS ARE ELIMINATED.
2. THE CAPACITOR C138 ON THE TUNING UNIT CONVERTER TRAP IS CHANGED FROM 30 MMF TO 51 OR 56 MMF.
3. C140 IS ELIMINATED.
4. L117 IS ELIMINATED.
5. THE SHORT CIRCUIT FROM THE CONVERTER TRANSFORMER TERMINAL TO THE VIDEO I.F. OUTPUT AT THE TUNING UNIT IS REMOVED. (SHORT NOT SHOWN ON THIS DIAG.)
6. AN 115 V. A.C. PLUG IS INSTALLED ON REAR OF CHASSIS AND WIRED IN PARALLEL WITH LINE INPUT RECEPTACLE.

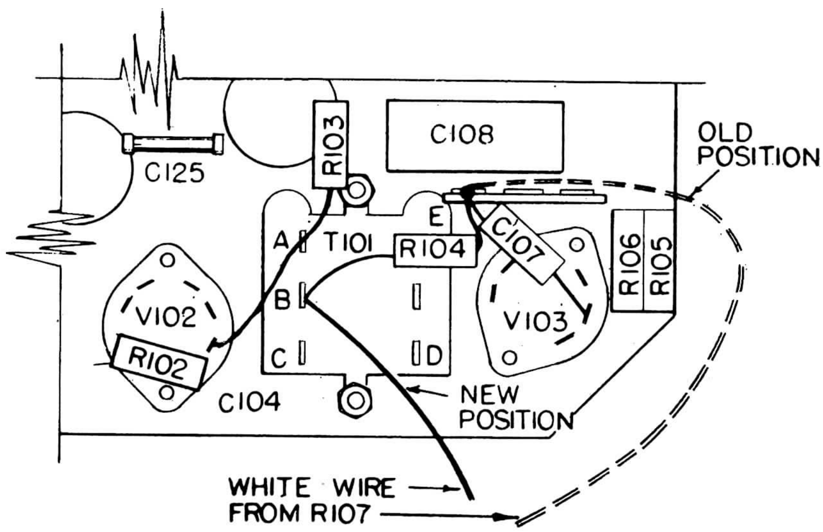
Fig. 1—Schematic Diagram, Sound and Video IF Stages





Schematic Diagram





Wiring Diagram

A production change has been made to secure greater sound sensitivity. The point of sound IF takeoff has been changed from its previous position in the tuning unit to the output of the 2nd video IF. This change takes place on all receivers produced after Serial No. E 906732. In addition, there are 84 TV chassis interspersed between Nos. E 906300 and E 906731 which have the new sound IF system.

In order to change the sound IF takeoff, the following circuit and part changes were made.

Old Part	New Part	Difference
RF4 Tuning Unit	RF6 Tuning Unit	RF6 has video output only, and no converter sound trap.
L102 (5298)	T107 (5296)	21.6 mc. trap coupled to 22.1 mc. peaking coil.
—	L117 (5311)	Added to all chassis except 143.
—	C177 (4029)	RF bypass for ratio detector load resistors.
C104 (4036)	C104 (4029) and C104A (4029)	Separate bypass condensers to eliminate coupling in common section.

CRITICAL VERTICAL SYNC.

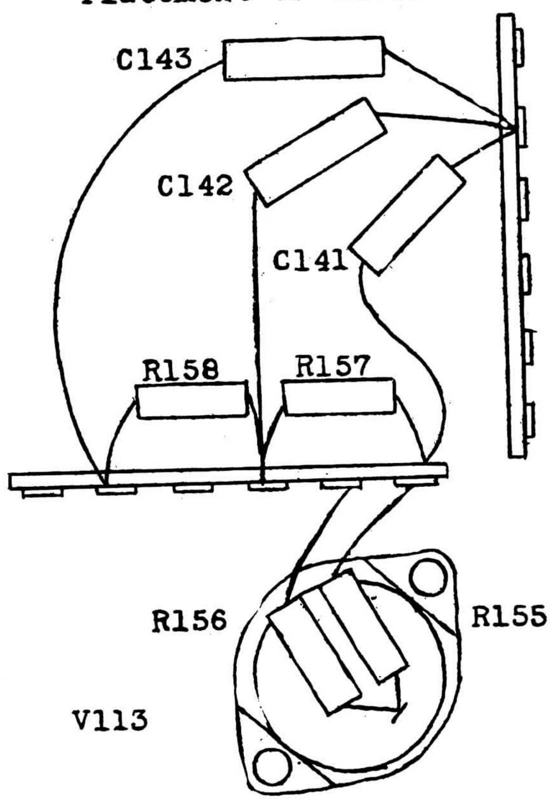
SYMPTOM: The VERTICAL LOCK adjustment is very critical and will hold the picture steady at only a very small point within its range. There is also a tendency for line voltage surges or other transient effects to cause the picture to skip frames vertically. In extreme cases the VERTICAL LOCK will not hold the picture in sync.

CAUSE: The vertical sync pulse integrating network capacitors, C141, C142, and C143 develop a high resistance DC leakage of several megohms. As the DC leakage resistance becomes lower, the vertical sync becomes more critical. Capacitors C142 and C143 are .005 mf, 400V. DC ratings and C141 is a .002 mf, 400V. DC rating. The initial turn-on surge voltage applied to these condensers reaches their rated value and causes a progressive breakdown in some cases. The .005 mf condensers usually show the first evidence of deterioration.

REMEDY: Replace the three integrating network capacitors with equal capacity 600V. DC rating parts. The resistors in the integrating network, particularly R155 and R156, should be checked to make sure they have not been damaged.

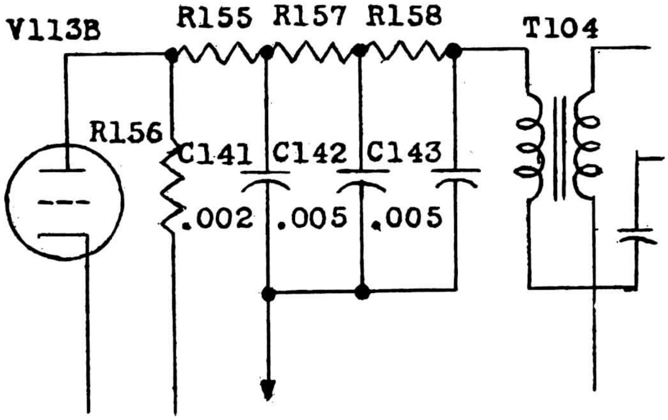
Symbol	Ratings	Part No.
C141	.002mf 600 V	4118
C142	.005mf 600 V	4102
C143	.005mf 600 V	4102

Placement of Parts



Vertical Integrating Network

Schematic Diagram



TUNABLE MODULATION HUM-TURRET TYPE TUNING UNITS

TV TURRET TUNER RF3, RF4, RF5, RF6

SYMPTOM: A low frequency hum that is tunable with the FINE TUNING control has been observed in a number of sets. The hum is at its loudest point when the sound is properly tuned in, and has been observed primarily on the channels where a strong signal is present.

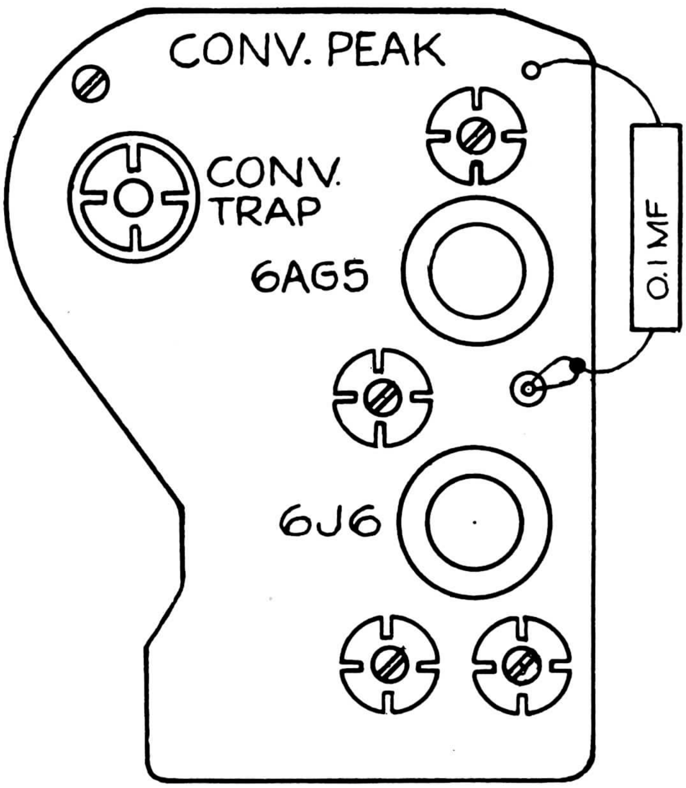
This hum can be reduced by removing one of the antenna leads, thereby reducing the signal.

REMEDY: There are three remedies that have been used in field service. The first, or capacitor method is recommended. The second and third have disadvantages and should be used only when conditions warrant.

1. Solder a 0.1 mfd paper tubular bypass condenser (voltage rating unimportant) from the test loop (see diagram) to ground on the tuning unit body. Do not ground to the main chassis. The end of the capacitor marked "FOIL" is to be used for the grounded end.

2. A second method is to solder a 5000 ohm, 1/2 watt composition resistor in place of the 0.1 mfd condenser. This method reduces the sensitivity of the tuning unit and also decreases the bias on the 6J6 converter grid, allowing greater plate current flow with resultant increased heating.

3. A third method is to ground the test loop directly. This materially decreases sensitivity in addition to increased current, and should not be used except in very pronounced hum cases, and where very strong signals are available.



TOP VIEW
TUNING UNIT

MODELS 826, 827, 828, 912, 913

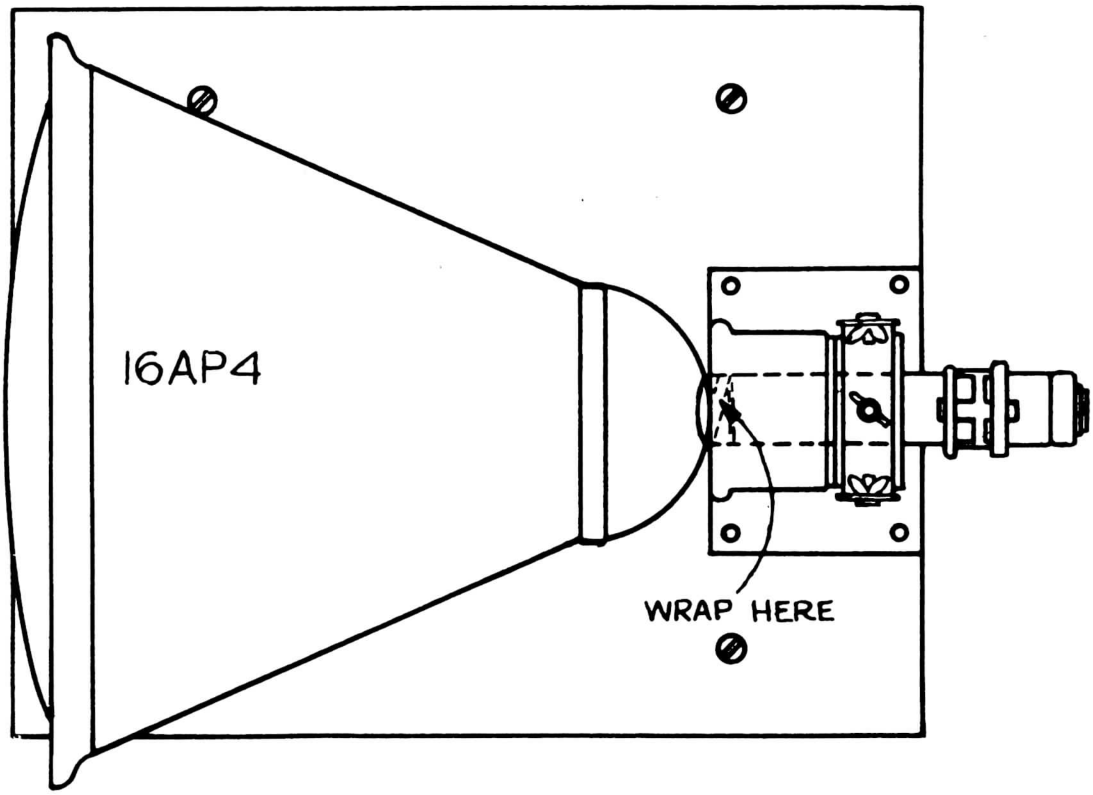
HIGH VOLTAGE ARCING AROUND 16 INCH METAL TUBE NECK TO DEFLECTION COIL

SYMPTOM: The most positive symptom is an arcing or sizzling sound originating in the vicinity of the deflection yoke assembly. In many cases this will also cause crackling noise in the sound channel and white or black splashes in the picture.

CAUSE: Leakage of the high voltage from the metal cone across the insulating portion allows arcing through the vinylite insulation and dust cover to the deflection coils.

REMEDY:

1. Loosen wing nuts on deflection yoke and pull deflection coil assembly back from the cone of the 16 inch tube, towards the focus coil.
2. Wrap two or three turns of vinylite tape around the base of the tube cone where it contacts the deflection coils.
3. Replace the deflection coil assembly.



WARNING NOTICE: ALL HOFFMAN TV RECEIVERS USING 15 INCH AND 16 INCH TUBES MOUNTED SEPARATE FROM CHASSIS

CAUTION: DO NOT OPERATE OR SERVICE SETS WHEN THE DEFLECTION COIL AND FOCUS COIL ASSEMBLY PLUG HAS BEEN REMOVED FROM ITS RECEPTACLE ON THE MAIN CHASSIS.

The focus control, R172, will be burned out because entire focusing current will be passed through this control, if the shunting focus coil is not in the circuit.

The horizontal and vertical deflection circuits may be damaged if operated in an unloaded condition, such as would result from removing the deflection coils from the circuit.

MODELS 610, 612, 820, 821, 822, 826, 827, 828, 912, 913

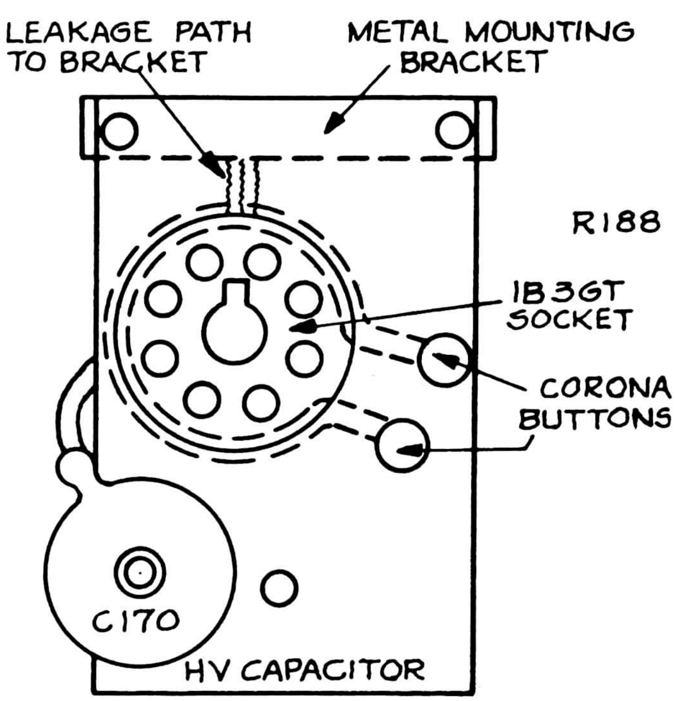
CHASSIS 140, 142, 146

ARCING IN HIGH VOLTAGE

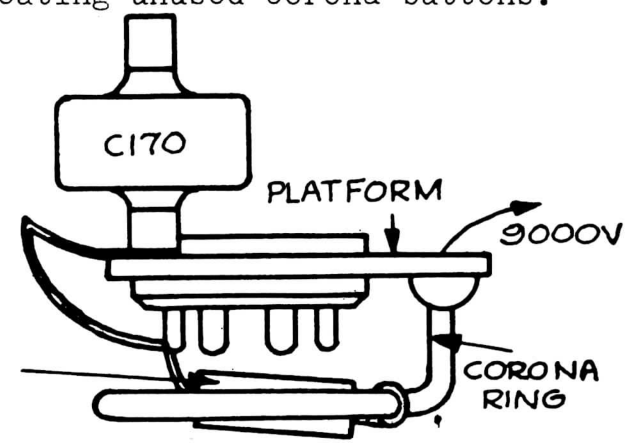
SYMPTOM: A continuous frying noise from the high voltage rectifier tube socket location, sometimes accompanied by audible periodic popping and momentary compression of the picture or raster is caused by arcing in the high voltage rectifier circuit.

CAUSE: During periods of high humidity, a leakage path is formed for high voltage between the corona buttons (see Fig. 1) and the metal retaining ring holding the 1B3GT tube socket. This ring assumes a high potential and then discharges to the grounded metal bracket which holds the bakelite platform.

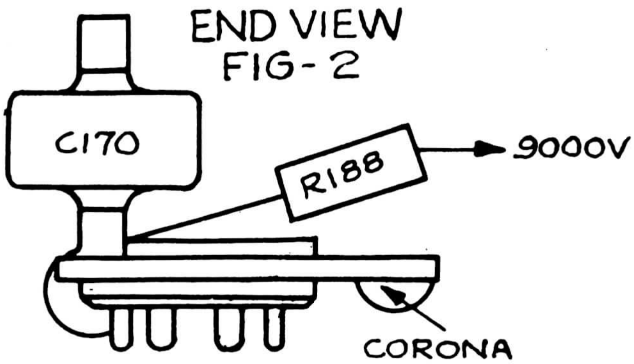
REMEDY:
1. Remove the 1 meg resistor, R188, (Fig. 2) from pin 2 of 1B3GT socket and corona ring.
2. Solder one end of the resistor to the solder lug at the base of the HV capacitor C170 (see Fig.3).
3. Remove the HV lead from the corona button and attach directly to the remaining end of R188. Make a smooth solder connection at this point and tape.
4. Take up slack in HV lead by means of clamp holding lead to cage
5. Remove unused corona ring by heating unused corona buttons.
Fig. 3 shows final wiring.



TOP VIEW FIG.-1



END VIEW FIG-2



END VIEW FIG-3

CHASSIS 140, 142, 143, 146, 147

CHANNEL 13 PICTURE INTERFERENCE FROM SOUND IF REGENERATION

SYMPTOM: A fine herringbone-like interference pattern is produced on Channel 13 only, when the sound FINE TUNING is adjusted correctly for the best sound reproduction. Tuning slightly off the best sound point will usually eliminate or reduce the interference pattern. This interference may also be noted during alignment, showing up when the set is properly aligned and tuned. The interference will disappear or diminish when the sound IF string is misaligned, often requiring only a slight detuning of the 2nd sound IF to eliminate the interference.

CAUSE: Regeneration in the sound IF string and failure of the electrolytic capacitor, C108, to act as an efficient RF bypass allows an interfering signal to get into the picture amplifiers and cause an interference pattern on Channel 13.

REMEDY: The combination screen and cathode bypass condenser for V102, 2nd sound IF, is a dual type .004 mfd condenser. This should be removed and replaced by two separate .005 mfd, ceramic type capacitors (Hoffman Part No. 4029). The separate capacitors are shown as C104 and C104A in the schematic of the Modified Sound Detector as shown in Production Changes. An additional bypass, .005 mfd (No. 4029), should be placed in parallel with the ratio detector load capacitor, C108.

These changes do not affect the sensitivity of the sound IF; yet they make the IF strip less "hot" for ease in tuning and alignment, in addition to eliminating the interference on Channel 13.

BURNOUT OF CONTRAST CONTROL

MODELS	CHASSIS
610	140
612	142
820, 821, 822	146
826, 827, 828	143
912, 913	147

SYMPTOM: Any of several symptoms may be present, or combinations of symptoms will occur. The major indications are: no picture: sound OK; poor picture with contrast control partially or totally inoperative; contrast control open, and excessive cathode voltage on V111.

CAUSE: The video amplifier, V111, 6AC7, shorts, or shorts intermittently and causes excessive current to pass through the contrast control, R137. This will completely destroy the control, or burn spots beyond which the control is not operative.

REMEDY: Replace the 6AC7, V111, and then replace the contrast control. The type 6AC7 tube may be replaced with a tube which is not suitable for a horizontal sync control tube in the Hoffman 30 tube chassis, 135, 141 or 145. However, this tube must be selected so that it draws sufficient plate current to produce 1.6 volts or more cathode bias measured across R136 with the contrast control set at maximum clockwise rotation. This amount of cathode bias will in-

indicate a tube that has sufficient output to produce the best picture.

Never replace the contrast control without first checking the 6AC7 and its circuit components.

VERTICAL LINEARITY

MODELS	CHASSIS
826, 827, 828	143
912, 913	147

SYMPTOM: Vertical compression or expansion of the top portion of the picture is controlled by the Vertical Linearity control, R169. Clockwise rotation of this control expands the top section of the picture . There is a certain amount of interaction with the vertical size control, R160, so that R169 also causes some change in the vertical size of the picture. The difficulty occurs primarily in sets using the 15 inch and 16 inch tubes, and is evidenced when the top of the picture is compressed even though the Vertical Linearity control is in its maximum clockwise position.

CAUSE: The maximum height adjustment usually required to fill the mask vertically on the 16 inch sets tends to stretch the bottom portion of the picture, which then produces the appearance that the top portion is relatively compressed. This relative compression must be compensated for by the Vertical Linearity control.

REMEDY: The relative range of the Vertical Linearity control, R169, can be increased by reducing the value of the series cathode resistor, R168, to 150 ohms. This may be accomplished by replacing R168 or paralleling the present 560 ohms with an additional 220 ohm resistor.

The value of R170, B+ dropping resistor in the vertical output plate circuit, should be checked. If the resistance of R170 is greater than 1000 ohms, it should be replaced by a resistor of that value. Present production is using 1000 ohm resistors; however, a number of 16 inch sets were produced with 2700 ohm resistors, and the 10 inch or 12 inch sets are manufactured with 6800 ohm resistors.

Try several different 6SN7 tubes in the V114 position. The output of various manufacturers' tubes is not the same and it is often possible to select a tube which will give the desired performance without circuit changes. The 6SN7 for the position of V114 may be interchanged with V112, V113 or V118.

NECK SHADOWS

MODELS	CHASSIS
610	140
612	142
820, 821, 822	146
826, 827, 828	143
912, 913	147

SYMPTOM: Shadowed or dark blurred edges or corners on the picture are neck shadows. They may occur on right or left edge or any corner, but most frequently they appear at the right top corner (facing toward tube), or along the whole right side of the picture. The incidence of neck shadows has been highest on Hoffman sets using the Dumont 15AP4 picture tube. To a lesser extent, the sets with the RCA 16AP4 tube and a few 12" and 10" sets have neck shadow difficulties.

CAUSE: The shadows are caused by obstruction of the electron beam in its maximum sweep position. As the deflection yoke bends the electron beam to its maximum horizontal deflection, the beam strikes the neck of the tube near a position where the tube enlarges into its conical section. The beam is diffused and does not strike the sensitized screen on the face of the tube.

There are several reasons why the beam may strike the tube neck. The deflection yoke or focus coil may be placed too far back on the neck. The tube neck may be off center in the focus coil, either because the tube is not mounted horizontally, or the axis of the tube neck is not on the same line as the major axis of the tube.

CAUTION

Do not attempt to compensate for neck shadows by misadjusting the ion trap. The ion trap must be adjusted to give maximum brightness. Follow the instructions in Service Data for these adjustments.

REMEDY: A number of remedies are suggested. Any one, or combination of several, may be necessary to clear up the trouble.

The primary objective of the remedies is to make certain that the tube is mounted with the neck horizontal as compared with the chassis, and exactly centered in the deflection and focus coils. With 15- or 16-inch tubes mounted separately from the chassis, it is generally advantageous and faster to remove the mounting board and tube from the cabinet.

Check the tube mounting. It is imperative that the tube neck axis Z - Z, shown in the side view, be level and concentric with the centers of the deflection and focus coils. The front portion (face) of the tube may be raised by shimming with rubber pads under the front rim where the tube is held in place by the vinyl-resin strap. The rear of the tube may be raised by shimming at points E with thin wood strips or metal washers. On some tubes the axis of the neck does not coincide with the axis of the bulb, and the neck appears to be cocked off at a slight angle. In lining up this type of tube, make the neck level and true with the focus coil to aid in elimination of neck shadows.

Rotate the tube in its mountings. It may be necessary to extend the high voltage lead to accomplish the rotation. This treatment is particularly effective if the tube neck is slightly off center.

Check the positioning of the deflection yoke and focus coil. They should be as far forward as possible. Loosen the wingnut A and slide the deflection coils to their maximum forward position. Loosen wingnuts B and slide the entire deflection yoke bracket securely up on the cone of the tube. Slide the focus coil bracket as far forward as possible. The bracket is slotted to allow adjustment when hold-down screw D is loosened. Approximately 1/8 inch spacing between deflection and focus coils must be allowed for centering adjustments. The centering adjustment screws C should be 1 3/4 inches long on the 15- or 16-inch tube, and 1 1/2 inches long in the 10- or 12-inch tube for maximum range of adjustment. Be sure to loosen the focus-coil locking-screw, found on 15 inch tubes only, before making any centering adjustments.

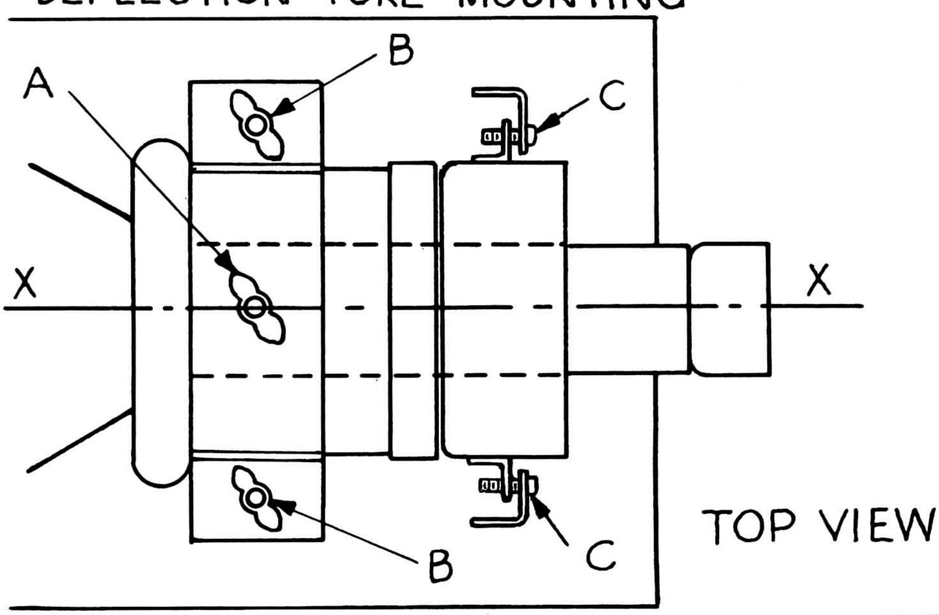
Reversing the polarity of the focus coil field by reversing the circuit connections (yellow and green wires) will often aid in reducing neck shadows. This also reverses the relative motion of the centering adjustments C. Best results have been obtained when the left screw (seen from the rear) is the vertical adjustment. Individual exceptions to this general condition may occur.

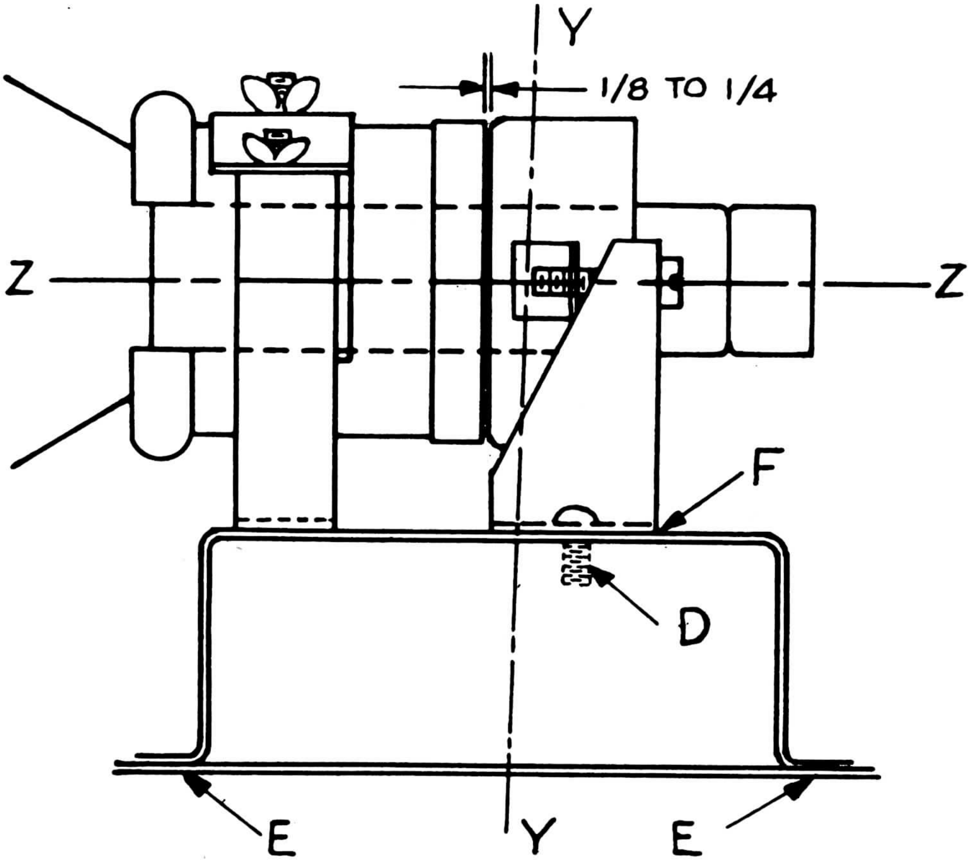
A non-concentric adjustment of the focus coil is occasionally necessary to allow for proper centering and elimination of neck shadows. Set the centering controls in about their middle range and loosen hold-down screws D. Move the focus-coil bracket by hand to any position that gives the best results. Experimentation is necessary, although a slight forward tip to the bracket and coil often achieves results. When the best position is determined, slip washers under the edge of the bracket at any raised point, (such as under one corner, F), and retighten the hold-down screws to maintain this position.

Slight neck shadow conditions may be hidden if sufficient width control is available to more than fill the picture mask. Move the picture slightly off center and then increase the width. The shadowed portion of the picture will be hidden behind the tube mask. It is obvious that this is not a correction, and can be used only in minor cases, or as a last resort after other methods have eliminated the major portion of the neck shadow.

The major corrections for neck shadow are all a part of the proper alignment of the tube neck, deflection yoke and focus coil.

FOCUS COIL AND DEFLECTION YOKE MOUNTING





SIDE VIEW

Models 826, 827, 828   Chassis 146

ELIMINATION OF OSCILLATION IN SOUND CHANNEL

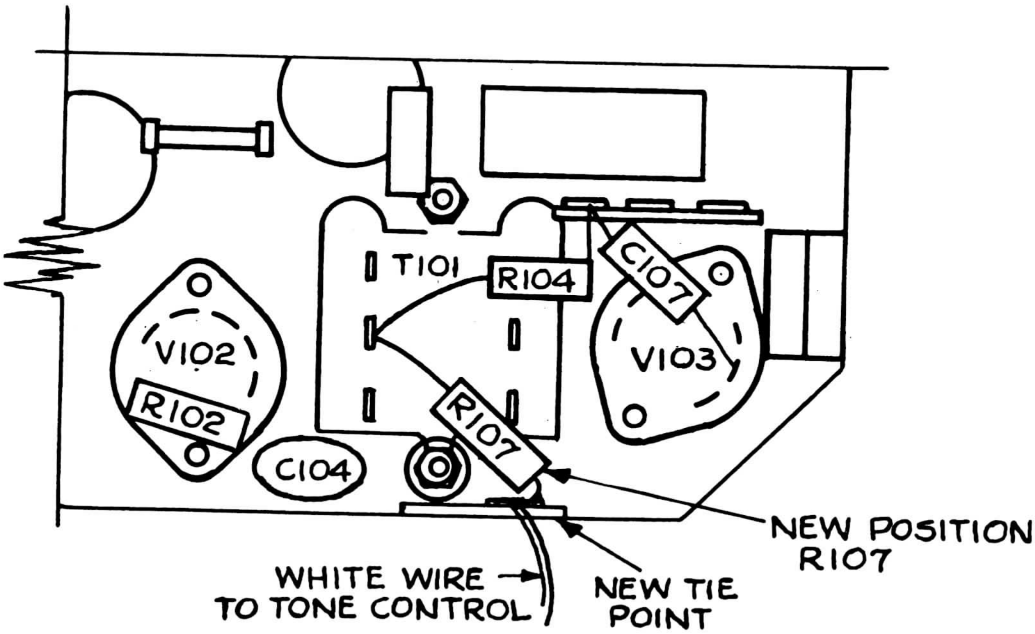
SYMPTOM: Under no-signal conditions, the receiver sound system will break into a low-frequency motorboating when the channel selector is set on any of the low frequency channels. Channel 3 produces the worst condition. When switched to the high frequency channels, the motor-boating gives way to a high frequency "rough" note, that sounds like a bad condition of noise "hash". This condition also affects the raster when no video signal is present, appearing as grainy horizontal lines similar to heavy noise conditions.

This oscillation or motor-boating disappears when a video and sound signal are present. It has appeared only on consolettes with the remote tuning controls. No indications have been observed on any of the other models. This condition should not be confused with audio buzz or oscillation in the audio output tube, both of which are noticeable whether or not signals are present.

CAUSE: The long lead to the remotely-located tone-control produces a feedback circuit which allows oscillation to occur. The remedy described below has been accomplished in production on all sets produced after Serial No. F908466. This change has been made in all models to eliminate any possibility of future difficulty.

REMEDY: Move the location of the audio coupling resistor, R107, 15,000 ohms 1/2 watt. An additional tie-point is mounted under one of the hold-down screws for T101. The resistor, R107, is removed from its present location at the tone control, and wired between terminal B of T101 and the new tie-point. The white wire previously connecting terminal B and R107 may be connected from the new tie-point to one end of the tone control where R107 was previously wired.

The relocation of R107 should be accomplished whenever a modification of the sound detector is made on chassis produced prior to Serial No. F904866. Refer to Service Bulletin for information on the sound detector modification.



THIS SKETCH SHOWS THE NEW POSITION OF R107 AND THE LOCATION OF SURROUNDING PARTS.

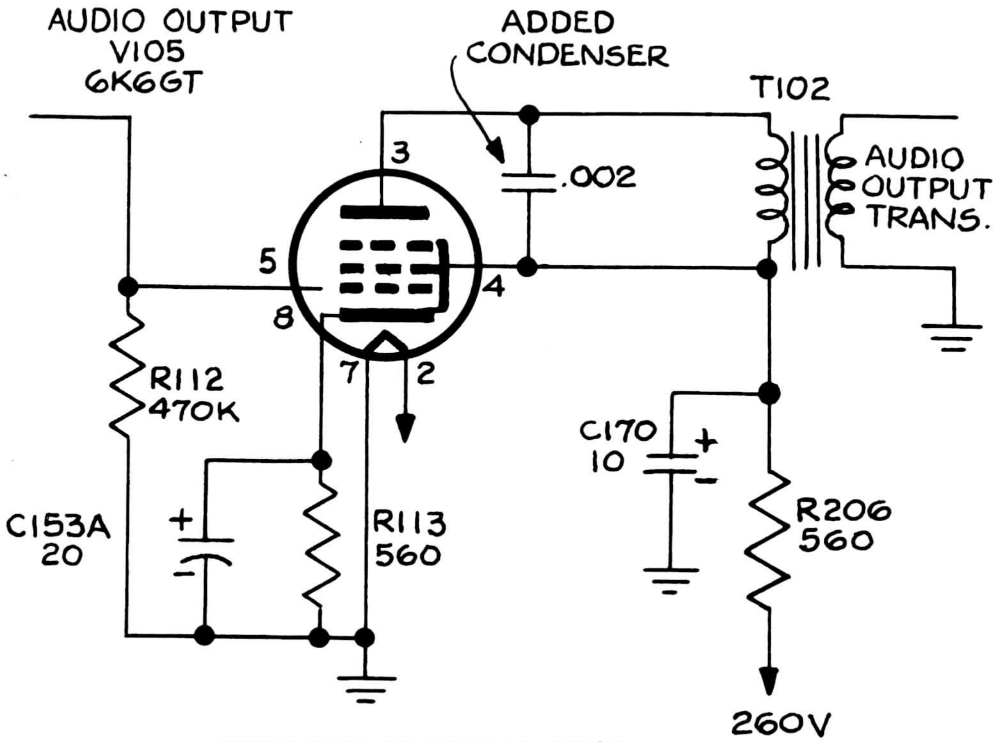
TV CHASSIS 140, 142, 143, 146, 147

HIGH PITCH AUDIO OSCILLATION

SYMPTOM: A high audio frequency tone which is not affected by the volume control or presence of sound signals can be traced to oscillation in the final audio amplifier. The sound is similar to a microphonic howl, but is not affected by tapping on the chassis. Generally, the amplitude is low and may be partially covered by the sound signal, but is quite apparent during pauses in speech or music.

REMEDY: Solder a bypass condenser, .002 mfd 600 volt paper tubular (Part No. 4118), between plate and screen, pins 3 and 4 of V105, the 6K6 audio output amplifier tube. This correction has been incorporated in all model sets produced after Serial No. F909900.

The abbreviated schematic diagram shows the circuit position of the added condenser.



UNSTABLE VERTICAL SYNC

MODELS	CHASSIS
610	140
612	142
820, 821, 822	146

SYMPTOM: Unstable vertical sync is characterized by a picture that tends to jump or bounce in a vertical direction. At times it appears that only part of the picture is affected. Operation of the VERTICAL LOCK control is normal, and will hold the picture in sync over a normal range of the control. The vertical "bounce" caused by noise pulses occurs erratically, except when consistent noise conditions are present the picture appears to "jiggle". Occasionally, the picture will skip one frame vertically. These conditions in a few cases, are accompanied by spasmodic horizontal tearout of the picture, which is caused by high amplitude noise pulses.

REMEDY: Modification of the sync separator and sync clipper circuits will provide better rejection of noise signals and faster recovery from the effect of noise pulses of high amplitude. The circuit modifications and part changes are listed below.

Old Part	New Part	Difference
R145 (4597)	R145 (4629)	Changed from 2.7 K to 5.6 K ohms
R147 (4315)	R147 (4626)	Changed from 1 meg to 20 meg
R147 connected from V112 pin 1 to ground	R147 connected from V112 pin 1 to parallel C138	Wiring change

Old Part	New Part	Difference
C138 (4109)	C138 (4124)	Changed from .05 mf to .02 mf, 600 V
R149 (4597)	---	Short out or remove from circuit
R154 (4555)	R154 (4614)	Changed from 680 K ohms 1/2 watt to 1 megohm 1/2 watt, 10%
---	R207 (4553)	R207 (1.2 K ohms, 1/2 watt) and R156 form voltage divider network for vertical sync pulses
R155 connected from pin 5 V113 to tie-point junction R157, C141	R155 connected from junction R207, R156 to tie-point junction R157, C141	Wiring change

These modifications have been made on all Hoffman television receivers produced after Serial No. G910973. Fig. 1 is a schematic diagram of the sync circuits showing the modified wiring and new parts values. The resistance value of R145 is 10,000 ohms in sets prior to Serial No. E904712, and must be changed to the new value. Removal of R149 from the circuit, and reconnection of C139 to R151 produces an empty tie-point that may be used for the junction of R207, R156, and R155. Two additional changes that have been made in production to aid in stabilizing the vertical sync should be included in all sets at the same time that modification of the sync circuit is accomplished. The portion of the circuit in which these changes are made is not shown in Figure 1.

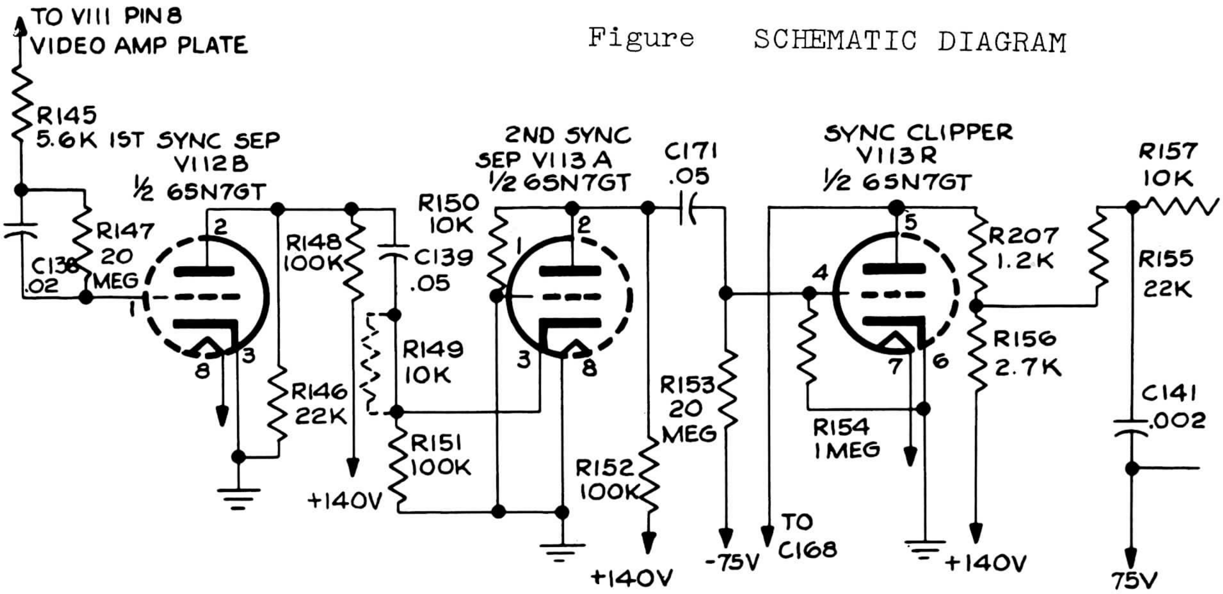
Old Part	New Part	Difference
C128 (4012)	C128 (4048)	Decreased from 100 mmf to 27 mmf, 10%
R167 (4559)	R167 (4618)	Increased from 47 K ohms to 220 K ohms, 1/2 watt to improve B+ regulation for V114A

The changes outlined for modification of the sync circuits apply for sets operated in low signal areas, where the average noise level approaches the signal level. In areas where normal signal and noise conditions exist, no advantage is gained by modifying present sets now in operation.

Conditions of weak signal with very heavy noise or high amplitude noise pulses may exist in a few locations. In these cases, a different time constant for the R147-C138 circuit will give better noise rejection performance. For better noise rejection, use .25 mf, 600 volt (4116) for C138 and 1.0 megohm, 1/2 watt (4614) for R147 in place of the values listed in the modification chart. The circuit wiring will still be the same as shown in Fig. 1 for either of the alternate sets of components. Better noise rejection is gained at the expense of sync separation, and vertical lines in the picture may exhibit slight waves or curves. The use of this alternate modification is limited to special circumstances best judged by the individual serviceman.

This alternate modification will not be accomplished in factory production, and is primarily intended for a field service measure in special cases.

Figure SCHEMATIC DIAGRAM



SIGNAL KEYED AGC

CIRCUIT MODIFICATIONS - ALL MODELS

A modification that can be applied to all Hoffman chassis has many advantages in controling the AGC voltage amplitude and recovery time. This modification allows the sync amplitude to be set just below limiting which will effectively decrease the sensitivity to noise pulses and will aid in maintaining sync stability. The curve in vertical lines in the top portion of the picture, commonly known as a "hook", is eliminated. Better contrast at low signal levels is another advantage.

The circuit changes allow the AGC voltage to be developed only during the period when sync pulses are present, which means that in a sense the AGC voltage is keyed by the sync pulses of the composite signal. Actually, the voltage is developed only during the sync pulse period, but a charge is maintained on the AGC circuit condenser C128, which provides a near constant AGC voltage. This charge leaks off through R131 so that long term amplitude changes of the signal will increase or decrease the AGC bias to compensate for the signal change.

The information in these service notes should be used with Service Notes headed "Unstable Vertical Sync", because some of the changes discussed there are rescinded by these notes. The AGC circuit changes compliment the sync changes, and the two must be combined to obtain full utilization of either change.

Refer to the original service data for the circuit and placement of parts that are to be changed or deleted.

The schematic with this bulletin illustrates the circuit after the modifications have been completed.

The circuit modification and parts changes are listed below..

Old Part	New Part	Difference
R134 (4571)	---	Remove from circuit
C131 (4112)	---	Remove from circuit
C128 (4048)	C128 (4012)	*Changed from 27 mmf to 100 mmf, N750 ceramic
---	R149 (4597)	*Added to 2nd Sync separator grid circuit
R137	Wiring Change	See wiring change below
C130	Wiring Change	See wiring change below

*Removal of R149 from the circuit and the capacity of C128 as 27 mmf are described in service notes titled "Unstable Vertical Sync", and have been accomplished at the factory only on sets produced after Serial No. G910973. The AGC modification returns these two parts to their original values, and therefore these changes are not needed on sets produced prior to this serial number. However, it is advisable to check through the AGC and sync circuits of any set being modified to assure that the parts and wiring conform to the desired modification.

WIRING CHANGES: The CONTRAST control, R137, is changed from a potentiometer type of operation to a rheostat type of operation. In an unmodified set, a green wire runs from one side of R137 to a tie-point junction of C131, R134, and a wire from pin 5 of V110, video detector, Remove this green wire from the connection on R137 and resolder the end to pin 2 of V113A, 2nd sync separator. C131 and R134 can be clipped from the circuit, and the changes accomplished with a minimum of resoldering.

After R134 is removed, on-half of the dual by-pass, C130, is still tied into the +140 supply string. Leave this connection intact as it provides by-passing for the +140 supply.

The AGC circuit changes have been accomplished on all sets currently available at the manufacturer's plant, and all sets so modified have been marked with "8-15" directly below the serial number on the rear of the chassis. These modifications will be incorporated in the manufacturing prodedure on all sets produced with serial numbers beginning with I 9----- or higher.

Capacity changes in the video detector circuit will affect the tuning of L104, 4th video IF peaking coil. A check of the IF bandpass and repeaking of L104 to 23.4 mc is necessary after all modifications have been completed.

The AGC and sync circuit changes have many advantages and should be made in all cases where "hook" or sync stability (vertical bounce) problems are encountered.

CHASSIS 140, 142, 146 PARTS LIST

Fig 16

Symbol	Description			Hoffman Part No.
C101, C103	(Part of T100)			
C102, C104, C115, C116, C118, C119, C121, C126, C130	2 x .004 Mmf		Ceramic Hi-K	4036
C105, C106	(Part of T101)			
C107, C166, C167	1000 Mmf	±20%	Ceramic Hi-K	4025
C108	5 Mf	50V	Electrolytic	4209
C109, C111, C113, C131	.01 Mf	400V	Paper	4112
C110, C172	.02 Mf	400V	Paper	4106
C112, C142, C143, C165, C168	.005 Mf	400V	Paper	4114
C114	56 Mmf	±10%	Mica	4034
C117, C120, C123, C127	220 Mmf	±20%	Ceramic	4026
C122, C124	5000 Mmf		Ceramic Hi-K	4029
C125	(Part of T103)			
C128	100 Mmf	±10%	Ceramic N750	4012
C129	.2 Mf	200V	Paper	4108
C132	5 Mmf	±5%	Ceramic N750	4028
C133, C139, C154, C163, C171	.05 Mf	400V	Paper	4101
C134	200 Mf	6V	Electrolytic	4216
C135	.25 Mf	600V	Paper	4116
C136, C149, C150	.01 Mf	600V	Paper	4103
C137, C145, C160	.1 Mf	400V	Paper	4121
C138, C161	.05 Mf	600V	Paper	4109
C141	.002 Mf	400V	Paper	4115
C144	.0047 Mf	±5%	Mica	4035
C146, C169	.25 Mf	400V	Paper	4117
C147	10-10-10 Mf	450V	Electrolytic	4215
C148	18 Mmf	±10%	Ceramic 1,500V	4040
C151	40 Mf	475V	Electrolytic	4212
C152	80 Mf 80 Mf 50 Mf	475V 150V 50V	Electrolytic Electrolytic Electrolytic	4213
C153	40 Mf 20 Mf 10 Mf	450V 25V 450V	Electrolytic Electrolytic Electrolytic	4219
C155	.0039 Mf	±10%	Mica	4037
C156	270 Mf	±10%	Mica	4022
C157	390 Mf	±5%	Mica	4039
C158	680 Mmf	±10%	Mica	4042
C159	65-315 Mmf Trimmer			4322
C162	.05 Mf	1,000V	Paper	4119
C164	.035 Mf	1,000V	Paper	4123
C170	500 Mmf	10,000V	Mica	4218
R100, R102	100 Ohm	±10%	½W Comp.	4566
R101, R103, R117, R124, R127, R129	1000 Ohm	±20%	½W Comp.	4542
R104	270 Ohm	±20%	½W Comp.	4601
R105, R106	10,000 Ohm	±5%	½W Comp.	4624
R107	15,000 Ohm	±10%	½W Comp.	4619
R108, R109	.1 Meg/ 1 Meg Pot. w/Switch (Tone-Vol.-Sw.) (Chassis 140)			4815
	.1 Meg/1Meg Pot. w/Switch (Tone-Vol.-Sw.) (Chassis 142 & 146)			4824
R110, R194	10 Meg	±20%	½W Comp.	4505
R111	270,000 Ohm	±10%	½W Comp.	4602
R112, R135, R191	470,000 Ohm	±20%	½W Comp.	4506
R113	560 Ohm	±10%	1W Comp.	4621
R114, R119, R145, R149, R150, R157, R158	10,000 Ohm	±10%	½W Comp.	4597
R115, R120	39 Ohm	±10%	½W Comp.	4620
R116, R121	120 Ohm	±10%	½W Comp.	4546
R118, R122	330 Ohm	±20%	½W Comp.	4509
R123, R128, R195, R197	6800 Ohm	±10%	½W Comp.	4557
R125, R190, R204	82 Ohm	±10%	½W Comp.	4598
R126, R133	3900 Ohm	±10%	½W Comp.	4527
R130	470,000 Ohm	±10%	½W Comp.	4622
R131, R154	680.000 Ohm	±20%	½W Comp.	4555
R132	22.000 Ohm	±20%	1W Comp.	4609
R134, R148, R151, R152, R162, R192, R193, R201	100,000 Ohm	±10%	½W Comp.	4571

CHASSIS 140, 142, 146 PART

Symbol	Descrip
R136	150 Ohm
R137, R144	.1 Meg 1000 Ohm Pot. (Brilliance-Contrast) (Chassis 140)
	.1 Meg 1000 Ohm Pot. (Brilliance-Contrast) (Chassis 142 & 146)
R138	See L107
R139, R146, R155	22,000 Ohm
R140	3300 Ohm
R141, R142, R143, R147, R184, R196	1 Meg
R153	20 Meg
R156	2700 Ohm
R159	1 Meg
R160	1 Meg Pot. (Vertical Hold) (Chassis 140)
	1 Meg Pot. (Vertical Hold) (Chassis 142 & 146)
R161	6800 Ohm
R163	3300 Ohm
R164	1.5 Meg
R165	2.2 Meg
R166	2.5 Meg Pot. (Vertical Size)
R167 R200	47,000 Ohm
R168	560 Ohm
R169	5000 Ohm Pot. (Vertical Linearity)
R170	6800 Ohm
R171	2500 Ohm (W.W.)
R172	1500 Ohm Pot. (Focus)
R173	1000 Ohm
R174	3000 Ohm C.T. (W.W.) Candoh
R175, R185	100 Ohm
R176	1500 Ohm
R177	25.000 Ohm (W.W.)
R178	1650 Ohm (W.W.) Candohm
R179	5600 Ohm
R180	150,000 Ohm
R181	50,000 Ohm Pot. (Horizontal Hold)
R182	220,000 Ohm
R183	68 Ohm
R186	10,000 Ohm
R187	3.3 Ohm
R188	1 Meg
R189	5800-500-500 Ohm (W.W.)
R202, R203	560 Ohm
R205	10,000 Ohm
R206*	1500 Ohm (W.W.)
L101, L102, L103, L104	Picture IF Coil
L105, L106	Peaking Coil, 140 mh
L107, R138	Peaking Coil, 200 mh on 22,000 Ohm
L108	Peaking Coil, 280 mh
L109	Filter Choke
L110	Focus Coil
L111	Horizontal Oscillator Coil
L112	Width Control
L113	Horizontal Linearity Control
L114, L115	Deflection Yoke Assembly
T100	1st Sound IF Transformer
T101	Ratio Detector Transformer
T102	Audio Output Transformer (Chassis 140, 142)
	(Chassis 146)
T103	Cathode Trap Transformer
T104	Vertical Oscillator Transform
T105	Vertical Output Transformer
T106	Power Transformer
T107	Horizontal Output Tarnsform
F100	Fuse ¼ amp 250 V
S101	On-Off Switch (Part of R10
--	AC Cord with Interlock Jack

*Chassis 142 and 146 only.

	Hoffman Part No.
C	4036
C	4025
	4209
	4112
	4106
	4114
	4034
	4026
K	4029
0	4012
	4108
0	4028
	4101
	4216
	4116
	4103
	4121
	4109
	4115
	4035
	4117
	4215
0V	4040
	4212
	4213
	4219
	4037
	4022
	4039
	4042
	4322
	4119
	4123
	4218
	4566
	4542
	4601
	4624
	4619
	4815
	4824
	4505
	4602
	4506
	4621
	4597
	4620
	4546
	4509
	4557
	4598
	4527
	4622
	4555
	4609
	4571

Fig 16

CHASSIS 140, 142, 146 PARTS LIST (Cont'd)

Symbol	Description			Hoffman Part No.
R136	150 Ohm	± 10%	½W Comp.	4616
R137, R144	.1 Meg 1000 Ohm Pot. (Brilliance-Contrast) (Chassis 140)			4816
	.1 Meg 1000 Ohm Pot. (Brilliance-Contrast) (Chassis 142 & 146)			4822
R138	See L107			
R139, R146, R155	22,000 Ohm	± 20%	½W Comp.	4501
R140	3300 Ohm	± 10%	1W Comp.	4612
R141, R142, R143, R147, R184, R196	1 Meg	± 20%	½W Comp.	4513
R153	20 Meg	± 10%	½W Comp.	4626
R156	2700 Ohm	± 10%	½W Comp.	4579
R159	1 Meg	± 10%	½W Comp.	4614
R160	1 Meg Pot. (Vertical Hold) (Chassis 140)			4817
	1 Meg Pot. (Vertical Hold) (Chassis 142 & 146)			4823
R161	6800 Ohm	± 10%	½W Comp.	4604
R163	3300 Ohm	± 10%	½W Comp.	4607
R164	1.5 Meg	± 10%	½W Comp.	4605
R165	2.2 Meg	± 10%	½W Comp.	4606
R166	2.5 Meg Pot. (Vertical Size)			4821
R167 R200	47,000 Ohm	± 10%	½W Comp.	4559
R168	560 Ohm	± 20%	½W Comp.	4599
R169	5000 Ohm Pot. (Vertical Linearity)			4820
R170	6800 Ohm	± 10%	1W Comp.	4608
R171	2500 Ohm (W.W.)	± 10%	3W	4714
R172	1500 Ohm Pot. (Focus)			4818
R173	1000 Ohm	± 10%	1W Comp.	4627
R174	3000 Ohm C.T. (W.W.) Candohm			4720
R175, R185	100 Ohm	± 10%	2W Comp.	4615
R176	1500 Ohm	± 5%	½W Comp.	4610
R177	25,000 Ohm (W.W.)		10W	4712
R178	1650 Ohm (W.W.) Candohm			4717
R179	5600 Ohm	± 5%	½W Comp.	4629
R180	150,000 Ohm	± 10%	½W Comp.	4589
R181	50,000 Ohm Pot. (Horizontal Hold)			4819
R182	220,000 Ohm	± 10%	½W Comp.	4618
R183	68 Ohm	± 20%	½W Comp.	4524
R186	10,000 Ohm	± 20%	1W Comp.	4609
R187	3.3 Ohm	± 10%	½W Comp.	4709
R188	1 Meg	± 20%	1W Comp.	4613
R189	5800-500-500 Ohm (W.W.)		2W Comp.	4713
R202, R203	560 Ohm	± 10%	½W .Comp.	4507
R205	10,000 Ohm	± 10%	2W Comp.	4611
R206*	1500 Ohm (W.W.)		3W	4715
L101, L102, L103, L104	Picture IF Coil			5298
L105, L106	Peaking Coil, 140 mh			5302
L107, R138	Peaking Coil, 200 mh on 22,000 Ohm		½W Comp.	5303
L108	Peaking Coil, 280 mh			5301
L109	Filter Choke			5125
L110	Focus Coil			55209
L111	Horizontal Oscillator Coil			5300
L112	Width Control			5295
L113	Horizontal Linearity Control			5294
L114, L115	Deflection Yoke Assembly			5293
T100	1st Sound IF Transformer			5304
T101	Ratio Detector Transformer			5305
T102	Audio Output Transformer (Chassis 140, 142)			5124
	(Chassis 146)			5131
T103	Cathode Trap Transformer			5299
T104	Vertical Oscillator Transformer			5127
T105	Vertical Output Transformer			5129
T106	Power Transformer			5015 or 5016
T107	Horizontal Output Tarnsformer			5123
F100	Fuse ¼ amp 250 V			9515
S101	On-Off Switch (Part of R108)			—
- -	AC Cord with Interlock Jack			3176

*Chassis 142 and 146 only.

CHASSIS

Symbol	
C101, C103	(Part of T100)
C102, C104, C115, C116, C118, C119, C121, C126, C130, C140*	2 x .004 Mmf
C105, C106	(Part of T101)
C107, C166, C167	1000 Mmf
C108	5 Mf
C109, C111, C113, C131, C148, C159, C161	.01 Mf
C110	.02 Mf
C112, C142, C143, C165, C168	.005 Mf
C114	56 Mmf
C117, C120, C123, C127	220 Mmf
C122, C124	5000 Mmf
C125	(Part of T103)
C128	100 Mmf
C129, C175	.2 Mf
C132	5 Mmf
C133, C139, C154, C160, C163, C171	.05 Mf
C134	200 Mf
C135, C164	.25 Mf
C136, C149, C150	.01 Mf
C137, C145, C162	.1 Mf
C138, C170	.05 Mf
C141	.002 Mf
C144	.0047 Mf
C146, C169	.25 Mf
C147	10-10-10 Mf
C151	40 Mf
C152	80 Mf
	80 Mf
	50 Mf
C153	40 Mf
	20 Mf
	10 Mf
C155	.0039 Mf
C156, C157	270 Mf
C158*	30 Mmf
C172, C173, C174	500 Mmf
C176	(Part of L112
R100, R102	100 Ohm
R101, R103, R117, R124, R127, R129	1000 Ohm
R104	270 Ohm
R105, R106	10,000 Ohm
R107	15,000 Ohm
R108, R109	.1 Meg/ 1 Meg (Tone-Vol.-Sw.)
R110, R194	10 Meg
R111	270,000 Ohm
R112, R135, R191	470,000 Ohm
R113	560 Ohm
R114, R119, R145, R149, R150, R157, R158	10,000 Ohm
R115, R120	39 Ohm
R116, R121	120 Ohm
R118, R122	330 Ohm
R123, R128, R195, R197	6800 Ohm
R125, R204	82 Ohm
R126, R133, R171	3900 Ohm
R130, R154, R173, R190	470,000 Ohm
R131	680,000 Ohm

MODELS 610, 612, 820, 821, 822, 826, 827, 828, 912, 913

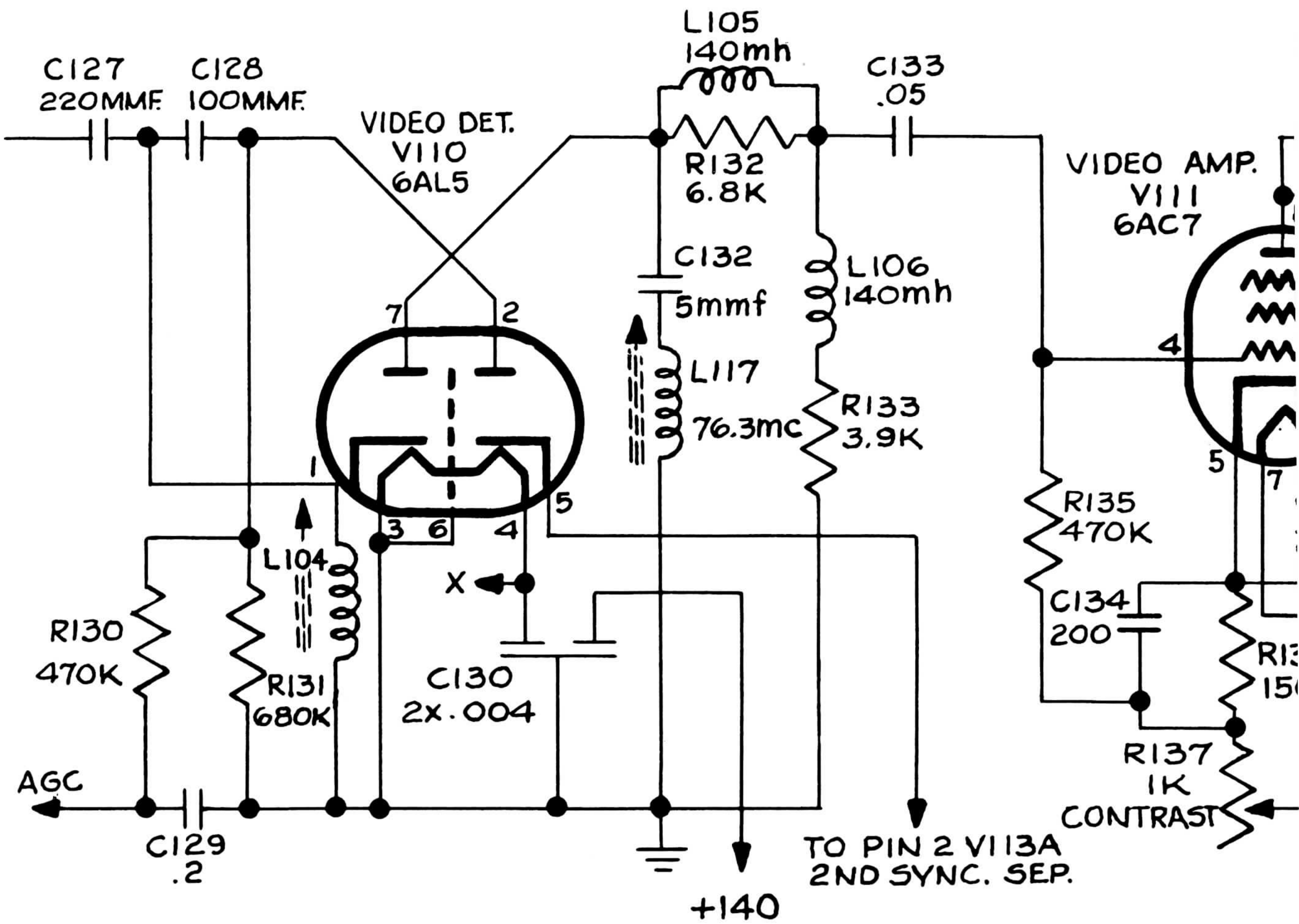
ARTS LIST (Cont'd)

...cription	Hoffman Part No.
±10% ½W Comp.	4616
	4816
	4822
±20% ½W Comp.	4501
±10% 1W Comp.	4612
±20% ½W Comp.	4513
±10% ½W Comp.	4626
±10% ½W Comp.	4579
±10% ½W Comp.	4614
d)	4817
ld)	4823
±10% ½W Comp.	4604
±10% ½W Comp.	4607
±10% ½W Comp.	4605
±10% ½W Comp.	4606
ze)	4821
±10% ½W Comp.	4559
±20% ½W Comp.	4599
	4820
±10% 1W Comp.	4608
±10% 3W	4714
	4818
±10% 1W Comp.	4627
ndohm	4720
±10% 2W Comp.	4615
±5% ½W Comp.	4610
10W	4712
ohm	4717
±5% ½W Comp.	4629
±10% ½W Comp.	4589
	4819
±10% ½W Comp.	4618
±20% ½W Comp.	4524
±20% 1W Comp.	4609
±10% ½W Comp.	4709
±20% 1W Comp.	4613
.) 2W Comp.	4713
±10% ½W Comp.	4507
±10% 2W Comp.	4611
3W	4715
	5298
	5302
½W Comp.	5303
	5301
	5125
	55209
l	5300
	5295
ntrol	5294
y	5293
er	5304
mer	5305
ner	
	5124
	5131
mer	5299
nformer	5127
rmer	5129
	5015 or 5016
nformer	5123
	9515
R108)	—
Jack	3176

y.

CHASSIS 143, 147 PARTS LIST

Symbol	Description	Hoffman Part No.
C101, C103	(Part of T100)	
C102, C104, C115, C116, C118, C119, C121, C126, C130, C140*	2 x .004 Mmf Ceramic Hi-K	4036
C105, C106	(Part of T101)	
C107, C166, C167	1000 Mmf ±20% Ceramic Hi-K	4025
C108	5 Mf 50V Electrolytic	4209
C109, C111, C113, C131, C148, C159, C161	.01 Mf 400V Paper	4112
C110	.02 Mf 400V Paper	4106
C112, C142, C143, C165, C168	.005 Mf 400V Paper	4114
C114	56 Mmf ±10% Mica	4034
C117, C120, C123, C127	220 Mmf ±20% Ceramic	4026
C122, C124	5000 Mmf Ceramic Hi-K	4029
C125	(Part of T103)	
C128	100 Mmf ±10% Ceramic N750	4012
C129, C175	.2 Mf 200V Paper	4108
C132	5 Mmf ±5% Ceramic N750	4028
C133, C139, C154, C160, C163, C171	.05 Mf 400V Paper	4101
C134	200 Mf 6V Electrolytic	4216
C135, C164	.25 Mf 600V Paper	4116
C136, C149, C150	.01 Mf 600V Paper	4103
C137, C145, C162	.1 Mf 400V Paper	4121
C138, C170	.05 Mf 600V Paper	4109
C141	.002 Mf 400V Paper	4115
C144	.0047 Mf ±5% Mica	4035
C146, C169	.25 Mf 400V Paper	4117
C147	10-10-10 Mf 450V Electrolytic	4215
C151	40 Mf 475V Electrolytic	4212
C152	80 Mf 475V Electrolytic 80 Mf 150V Electrolytic 50 Mf 50V Electrolytic	4213
C153	40 Mf 450V Electrolytic 20 Mf 25V Electrolytic 10 Mf 450V Electrolytic	4219
C155	.0039 Mf ±10% Mica	4037
C156, C157	270 Mf ±10% Mica	4022
C158*	30 Mmf ±10% Ceramic NPO	4043
C172, C173, C174	500 Mmf 10,000V Mica	4218
C176	(Part of L112)	
R100, R102	100 Ohm ±10% ½W Comp.	4566
R101, R103, R117, R124, R127, R129	1000 Ohm ±20% ½W Comp.	4542
R104	270 Ohm ±20% ½W Comp.	4601
R105, R106	10,000 Ohm ±5% ½W Comp.	4624
R107	15,000 Ohm ±10% ½W Comp.	4619
R108, R109	.1 Meg/1 Meg Pot. w/Switch (Tone-Vol.-Sw.)	4815
R110, R194	10 Meg ±20% ½W Comp.	4505
R111	270,000 Ohm ±10% ½W Comp.	4602
R112, R135, R191	470,000 Ohm ±20% ½W Comp.	4506
R113	560 Ohm ±10% 1W Comp.	4621
R114, R119, R145, R149, R150, R157, R158	10,000 Ohm ±10% ½W Comp.	4597
R115, R120	39 Ohm ±10% ½W Comp.	4620
R116, R121	120 Ohm ±10% ½W Comp.	4546
R118, R122	330 Ohm ±20% ½W Comp.	4509
R123, R128, R195, R197	6800 Ohm ±10% ½W Comp.	4557
R125, R204	82 Ohm ±10% ½W Comp.	4598
R126, R133, R171	3900 Ohm ±10% ½W Comp.	4527
R130, R154, R173, R190	470,000 Ohm ±10% ½W Comp.	4622
R131	680,000 Ohm ±20% ½W Comp.	4555



KEYED SYNC PULSE MODIFICATION

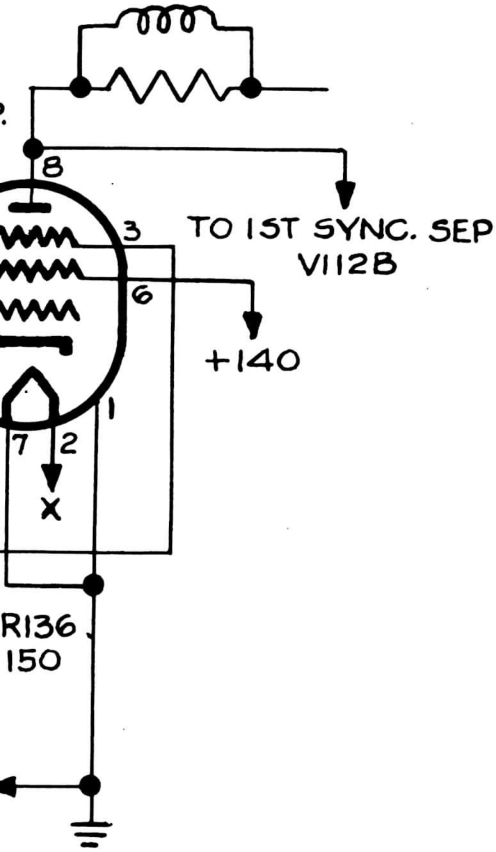
SYNC CIRCUIT MODIFICATION

ON 16" TV RECEIVERS

MODEL	CHASSIS
826, 827, 828	143
830, 831	151
917, 918	152

REFERENCE: Service Notes "Unstable Vertical Sync" describes the sync circuit modification for all Hoffman chassis except the 16" set. A schematic diagram of the modified circuits is included with these notes. Additional information on AGC improvements which aid in stabilizing the picture synchronization is published in Field Service Notes headed "Signal Keyed AGC - Circuit Modifications". These three bulletins should be used together when any sync or AGC modifications are made.

MODIFICATIONS: Fewer changes are required on the Hoffman 16" receiver than on the 10" or 12" models. The required changes are listed below. No other sync circuit changes need be made. Particularly note that the vertical sync integrating network remains connected directly to the plate of V113B, sync clipper tube.



CHASSIS 143, 147 PARTS LIST (Cont'd)

Symbol	Description	Hoffman Part No.
R132	22.000 Ohm ±20% 1W Comp.	4609
R134, R148, R151, R152, R162, R192, R193, R201	100,000 Ohm ±10% ½W Comp.	4571
R136	150 Ohm ±10% ½W Comp.	4616
R137, R144	.1 Meg/1000 Ohm Pot. (Brilliance-Contrast)	4816
R138	See L107	
R139, R146, R155	22,000 Ohm ±20% ½W Comp.	4501
R140, R172	1500 Ohm Pot. (Horizontal Linearity) (Focus)	4818
R141, R142, R143, R147, R196	1 Meg ±20% ½W Comp.	4513
R153	20 Meg ±10% ½W Comp.	4626
R156, R179, R199	5600 Ohm ±5% ½W Comp.	4629
R159	1 Meg ±10% ½W Comp.	4614
R160	1 Meg Pot. (Vertical Hold)	4817
R161	6800 Ohm ±10% ½W Comp.	4604
R163	3300 Ohm ±10% ½W Comp.	4607
R164	1.5 Meg ±10% ½W Comp.	4605
R165	2.2 Meg ±10% ½W Comp.	4606
R166	2.5 Meg Pot. (Vertical Size)	4821
R167 R198, R200	47,000 Ohm ±10% ½W Comp.	4559
R168	560 Ohm ±20% ½W Comp.	4599
R169	5000 Ohm Pot. (Vertical Linearity)	4820
R170	2700 Ohm ±10% ½W Comp.	4579
R174	4250 Ohm Taped at 1600 (W.W.) Candohm	4718
R175 R183	100 Ohm ±10% 2W Comp.	4615
R176	1500 Ohm ±5% ½W Comp.	4610
R177	25,000 Ohm (W.W.) 10W	4712
R178	1650 Ohm (W.W.) Candohm	4717
R180	150,000 Ohm ±10% ½W Comp.	4589
R181	50,000 Ohm Pot. (Horizontal Hold)	4819
R182	220,000 Ohm ±10% ½W Comp.	4618
R184	15,000 Ohm (W.W.) ±5% 5W	4716
R185, R188	4.7 Ohm ±10% ½W Comp.	4719
R186, R187	1 Meg ±20% 2W Comp.	4596
R189	500,000 Ohm ±10% 1W Comp.	4575
R202, R203	560 Ohm ±10% ½W Comp.	4507
L101, L102, L103, L104, L117	Picture IF Coil	5298
L105, L106	Peaking Coil, 140 mh	5302
L107, R138	Peaking Coil, 200 mh on 22,000 Ohm ½W Comp.	5303
L108	Peaking Coil, 280 mh	5301
L109	Filter Choke	5132
L110	Focus Coil (16AP4)	5292
	(15AP4)	5309
L111	Horizontal Oscillator Coil	5300
L112	Width Control	5290
L113	4.5 Mc Trap	5308
L114, L115	Deflection Yoke ssembly	5293
L116	Horizontal Linearity Control	5291
T100	1st Sound IF Transformer	5304
T101	Ratio Detector Transformer	5305
T102	Audio Output Transformer	5131
T103	Cathode Trap Transformer	5299
T104	Vertical Oscillator Transformer	5127
T105	Vertical Output Transformer	5129
T106	Power Transformer	5117
T107	Horizontal Output Tarnsformer	5123
F100	Fuse ¼ amp 250 V	9515
S101	On-Off Switch (Part of R108)	—
—	AC Cord with Interlock Jack	3176

Chassis 143 only.

Old Part	New Part	Difference
R145 (4597)	R145 (4629)	Changed from 2.7K to 5.6K ohms
R147 (4315)	R147 (4626)	Changed from 1 meg to 20 meg
R147 connected from V112 pin 1 to ground	R147 connected from V112 pin 1 to parallel C138	Wiring change
C138 (4109)	C138 (4124)	Changed from .05 mf to .02 mf 600 V