

HOFFMAN MODEL 21M1100A  
(Ch. 703A-21)

TRADE NAME	Hoffman Model 21M1100A (Ch. 703A-21)	
MANUFACTURER	Hoffman Radio Corp., 6200 S. Avalon Blvd., Los Angeles 3, Calif.	
TYPE SET	Color Television Receiver	
TUBES	Twenty-Eight	
POWER SUPPLY	110-120 volts AC-60 Cycle	RATING 3.1 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)	

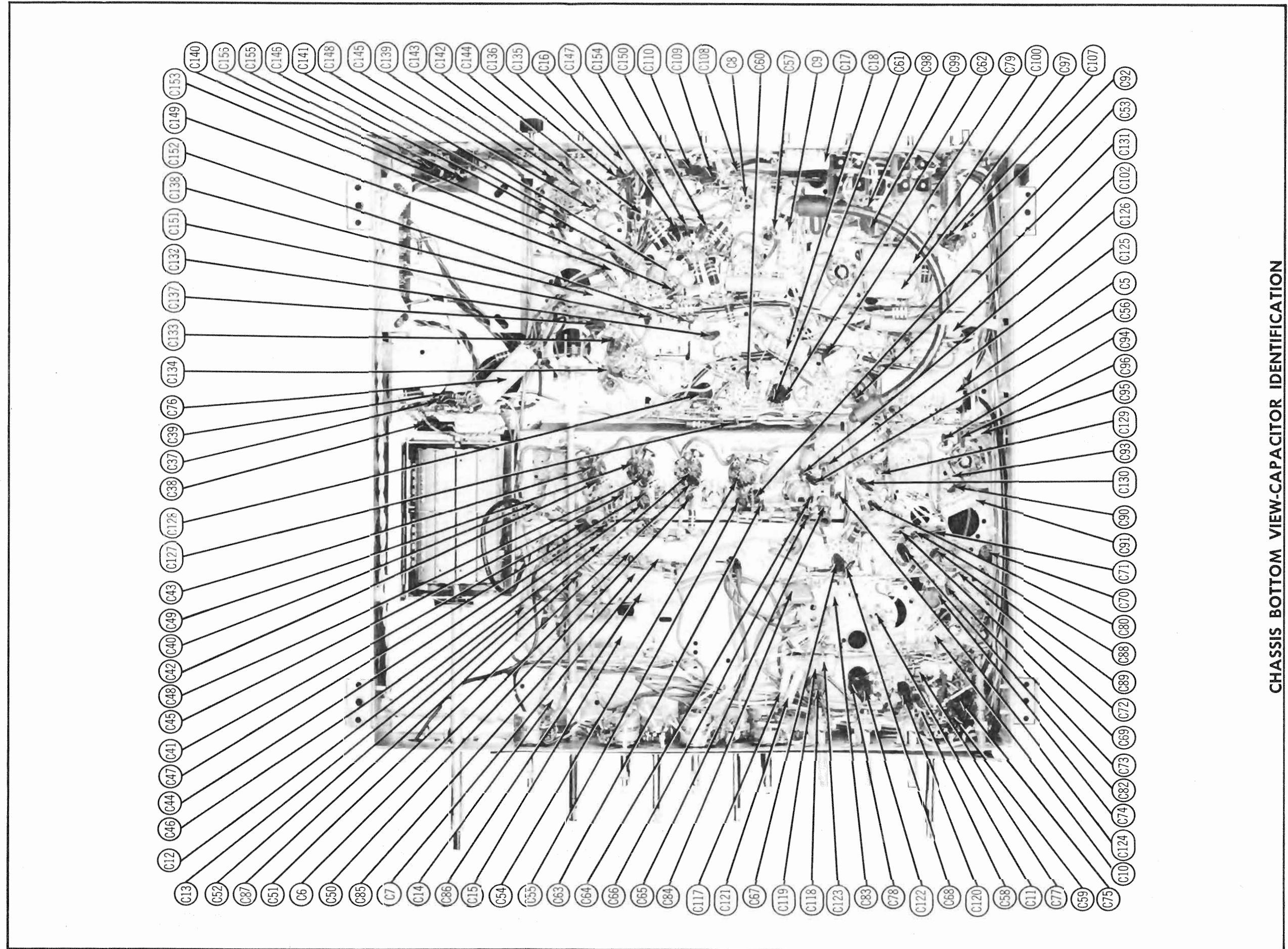
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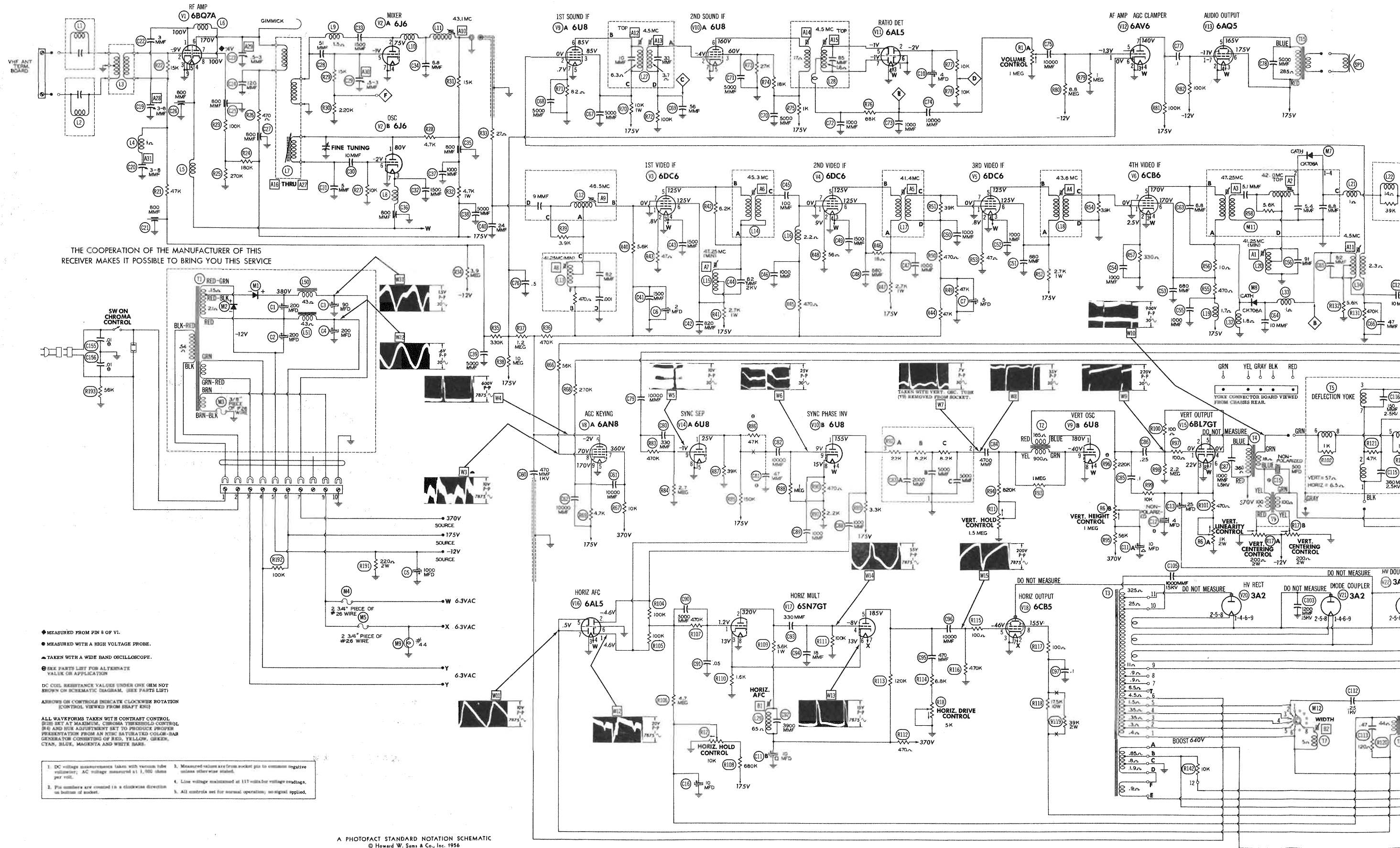
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CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

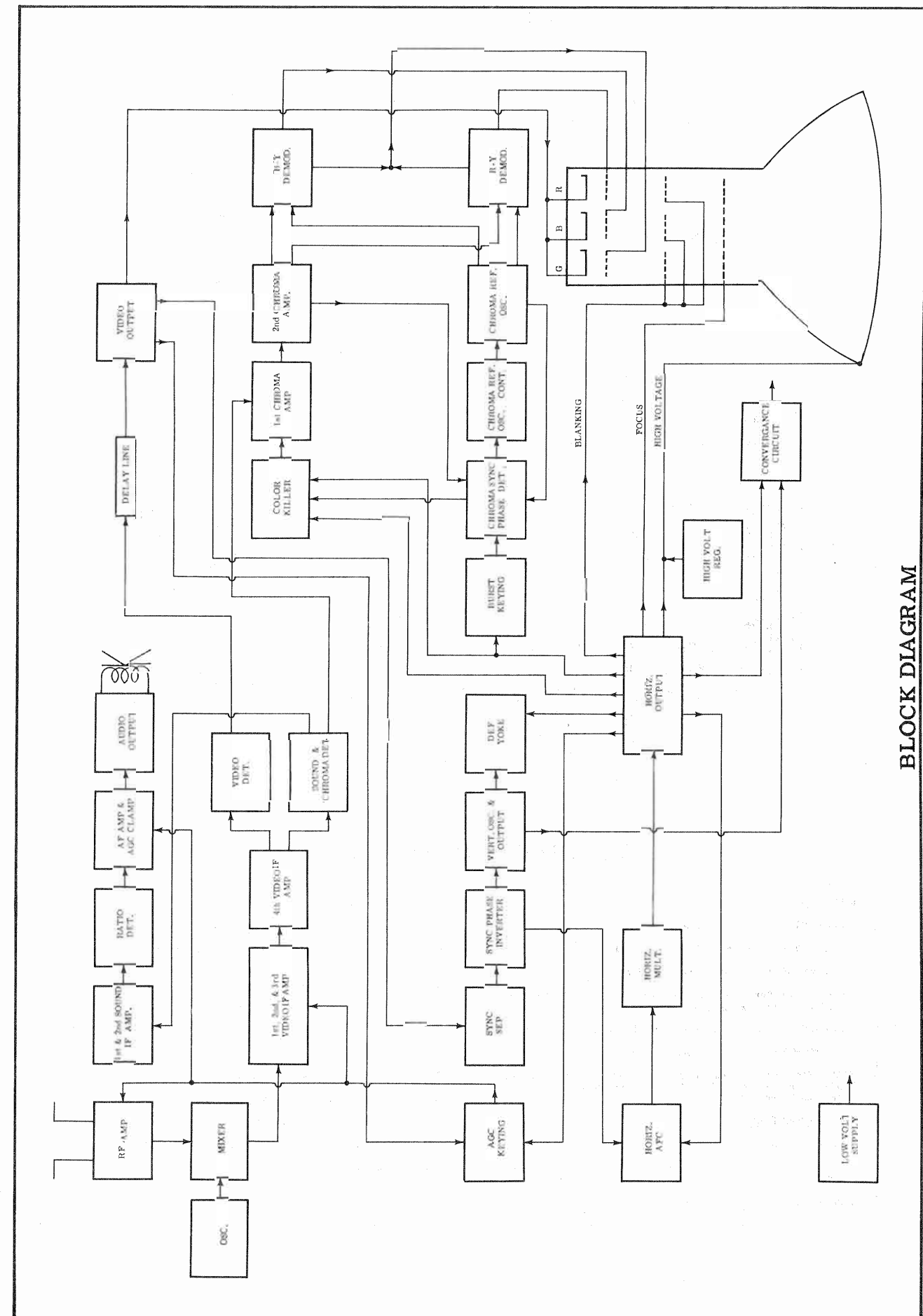
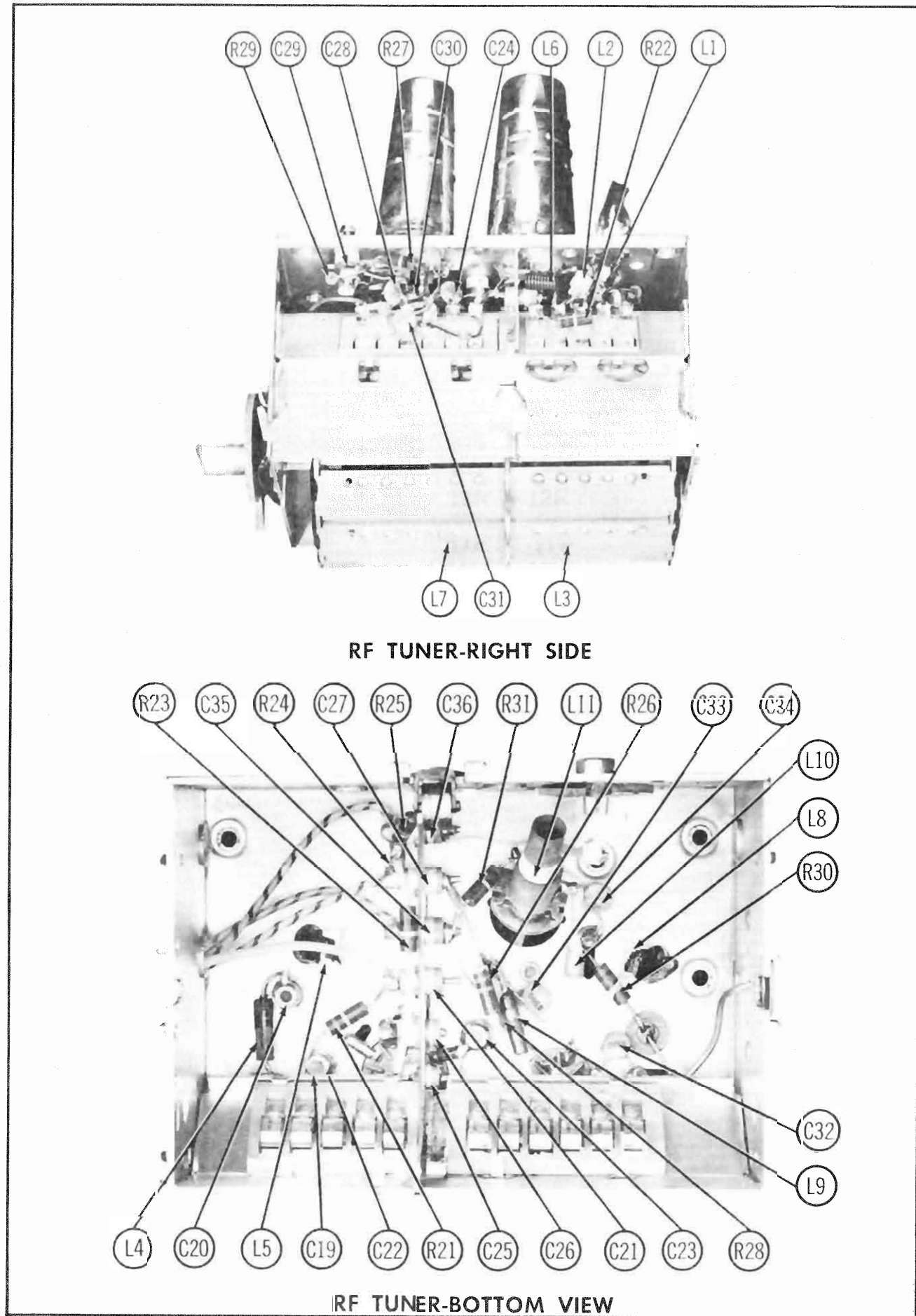


THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

- ◆ MEASURED FROM PIN 8 OF V1.
  - MEASURED WITH A HIGH VOLTAGE PROBE.
  - ▲ TAKEN WITH A WIDE BAND OSCILLOSCOPE.
  - ◎ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION.
  - DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM. (SEE PARTS LIST)
  - ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
  - ALL WAVEFORMS TAKEN WITH CONTRAST CONTROL SET AT MAXIMUM, CHROMA THRESHOLD CONTROL SET TO PRODUCE PROPER PRESENTATION FROM AN NTSC SATURATED COLOR-BAR GENERATOR CONSISTING OF RED, YELLOW, GREEN, CYAN, BLUE, MAGENTA AND WHITE BARS.
1. DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1,500 ohms per volt.
  2. Pin numbers are counted in a clockwise direction in bottom of socket.
  3. Measured values are from socket pin to common negative unless otherwise stated.
  4. Line voltage maintained at 117 volts for voltage readings.
  5. All controls set for normal operation; no signal applied.

A PHOTOFAC STANDARD NOTATION SCHEMATIC  
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## RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7A	INF	1.5Meg	0Ω	.1Ω	0Ω	†550Ω	200KΩ	INF	0Ω
V 2	6J6	†9.5KΩ	†15KΩ	.1Ω	0Ω	235KΩ	10KΩ	0Ω		
V 3	6DC6	100KΩ	47Ω	0Ω	.1Ω	†2.7KΩ	†2.7KΩ	0Ω		
V 4	6DC6	100KΩ	56Ω	.1Ω	0Ω	†2.7KΩ	†2.7KΩ	0Ω		
V 5	6DC6	50KΩ	47Ω	.1Ω	0Ω	†2.7KΩ	†2.7KΩ	0Ω		
V 6	6CB6	.1Ω	330Ω	0Ω	.1Ω	†560Ω	†550Ω	0Ω		
V 7	12BY7	90Ω	4.2KΩ	0Ω	0Ω	0Ω	.1Ω	†5KΩ	†7.5KΩ	0Ω
V 8	6AN8	†25KΩ	5Meg	0Ω	.1Ω	0Ω	600KΩ	†10KΩ	†65KΩ	†4.7KΩ
V 9	6U8	†750KΩ	470KΩ	†10KΩ	.1Ω	0Ω	†10KΩ	82Ω	0Ω	1.5Meg
V 10	6U8	†3.3KΩ	100KΩ	†15KΩ	.1Ω	0Ω	†1KΩ	0Ω	2.7KΩ	1Meg
V 11	6AL5	0Ω	20KΩ	.1Ω	0Ω	INF	0Ω	INF		
V 12	6AV6	1Meg	0Ω	0Ω	.1Ω	NC	1.2Meg	†100KΩ		
V 13	6AQ5	100KΩ	0Ω	.1Ω	0Ω	†350Ω	†43Ω	100KΩ		
V 14	6U8	†45KΩ	4Meg	†10.6KΩ	.1Ω	0Ω	†600Ω	0Ω	0Ω	2.7Meg
V 15	6BL7GT	2.2Meg	†400Ω	1KΩ	2.2Meg	†400Ω	1KΩ	.1Ω	0Ω	
V 16	6AL5	5Meg	5Meg	0Ω	.1Ω	2.5KΩ	0Ω	2.5KΩ		
V 17	6SN7GT	5Meg	†6.2KΩ	1.6KΩ	100KΩ	†120KΩ	1.6KΩ	.1Ω	0Ω	
V 18	6CB5	NC	.1Ω	0Ω	NC	470KΩ	NC	0Ω	†13KΩ	TOP CAP .13Ω
V 19	6AU4GT	NC	NC	380KΩ	NC	†50Ω	NC	.1Ω	0Ω	
V 20	3A2	20Meg	20Meg	INF	20Meg	20Meg	20Meg	INF	20Meg	TOP CAP .38Ω
V 21	3A2		PINS 1-8	HAVE	INF	RESISTANCE				TOP CAP 20Meg
V 22	3A2		PINS 1-8	HAVE	INF	RESISTANCE				TOP CAP INF
V 23	6BK4	†1KΩ	0Ω	NC	NC	1.5Meg	NC	.1Ω	NC	TOP CAP INF
V 24	6BJ7	2Meg	2.8Ω	0Ω	0Ω	.1Ω	2.8Ω	220Ω	3Meg	2.8Ω
V 25	6CL6	0Ω	500Ω	†19KΩ	.1Ω	0Ω	†4KΩ	0Ω	†19KΩ	500Ω
V 26	6U8	†600Ω	100KΩ	†10.6KΩ	.1Ω	0Ω	†600Ω	0Ω	2.7KΩ	3Meg
V 27	12BH7	†42KΩ	17KΩ	6.8KΩ	0Ω	0Ω	†20KΩ	†7KΩ	6.8KΩ	.1Ω
V 28	21AXP22	†100KΩ	†100KΩ	†68KΩ	†60KΩ	†60KΩ	†80KΩ	†180-300KΩ	NC	15Meg
		PIN 10 NC	PIN 11 †180-300KΩ	PIN 12 †100KΩ	PIN 13 †60KΩ	PIN 14 †100KΩ				

†MEASURED FROM JUNCTION OF C1 & C2.  
 †MEASURED FROM OUTPUT OF M1.  
 †MEASURED FROM OUTPUT OF M1.  
 †MEASURED FROM PIN 3 OF V19.  
 NC-NO CONNECTION.

## DISASSEMBLY INSTRUCTIONS

### MAIN CHASSIS REMOVAL

1. Remove 7 push-on type control knobs from front panel of cabinet.
2. Remove 9 wood screws and 1 metal screw. Remove rear cover.
3. Remove 2 wing nuts holding side door (accessible to chassis bottom).
4. Disconnect picture tube socket, speaker leads, H. V. lead and power cable (loosen 10 screws on terminal board).
5. Remove 4 chassis bolts (accessible inside side door). Remove chassis.
6. Remove 4 wood screws. Remove speaker.

NOTE: For servicing it may not be necessary to remove the chassis. Remove rear cover and 2 wing nuts for side door to open the bottom of the chassis accessible thru this door.

### POWER CHASSIS REMOVAL

1. Remove 9 wood screws and 1 metal screw. Remove rear cover.
2. Remove power cable from main chassis (loosen 10 screws on terminal board).
3. Remove 4 chassis bolts. Remove power chassis.

### PICTURE TUBE REMOVAL

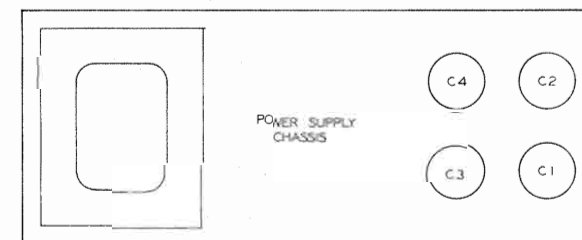
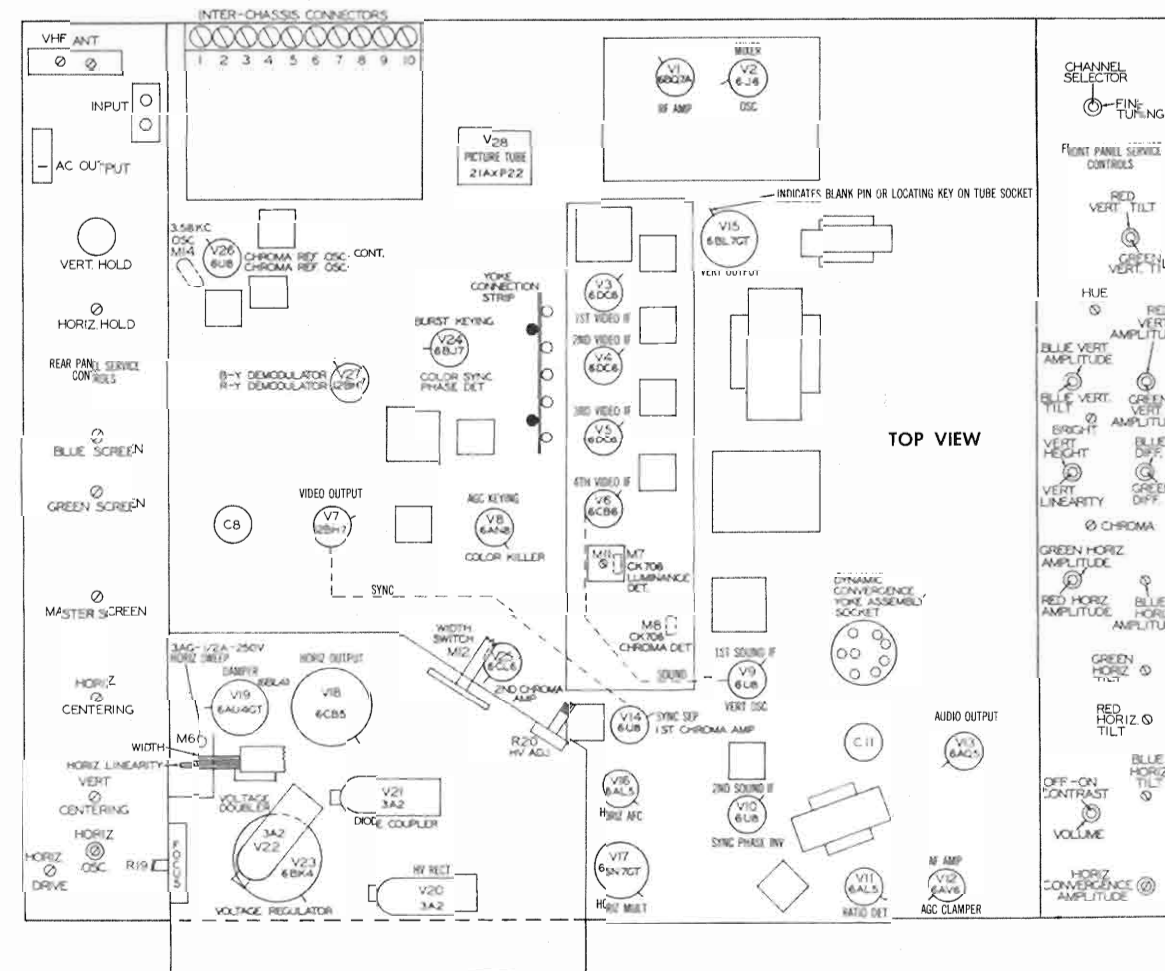
1. Remove main chassis and power chassis from cabinet.
2. Remove blue beam positioning magnet, centering ring and convergence coils.
3. Lay cabinet face down on a soft surface.
4. Remove 4 hex nuts holding yoke assembly.
5. Loosen strap bolt. Remove H. V. shield.
6. Remove picture tube.

NOTE: Use extreme caution when removing picture tube.

### PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove 3 wood screws holding metal strip at the top edge of safety glass. Remove metal strip and safety glass. Use extreme caution when removing safety glass.

## TUBE PLACEMENT CHART



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## ALIGNMENT INSTRUCTIONS (cont)

3.58MC TRAP ALIGNMENT

Set brightness and contrast controls fully clockwise.

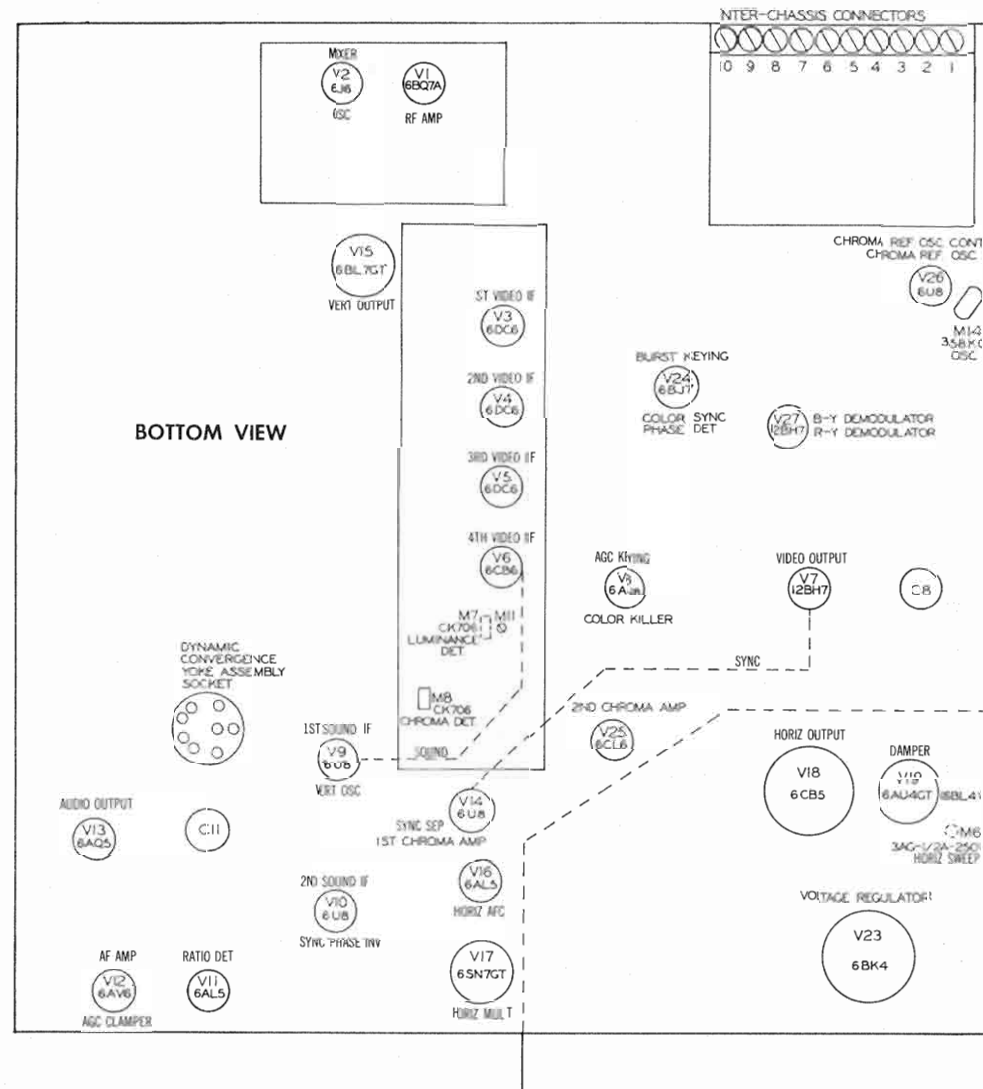
DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
27. .005MFD	High side to point $\diamond$ . Low side to chassis.	Not used	3.58MC (400-Mod)	Any	Vert. Amp. thru detector (Fig. 5) to pin 5 (cathode) of picture tube. Low side to chassis.	A40	Adjust for MINIMUM 400% modulation on scope. Remove 200 $\Omega$ , 2 watt resistor from pin 3 of V18 to chassis. Connect pin 3 of V18 to chassis. Replace V17 in its socket.

### CHROMA REFERENCE OSCILLATOR ALIGNMENT

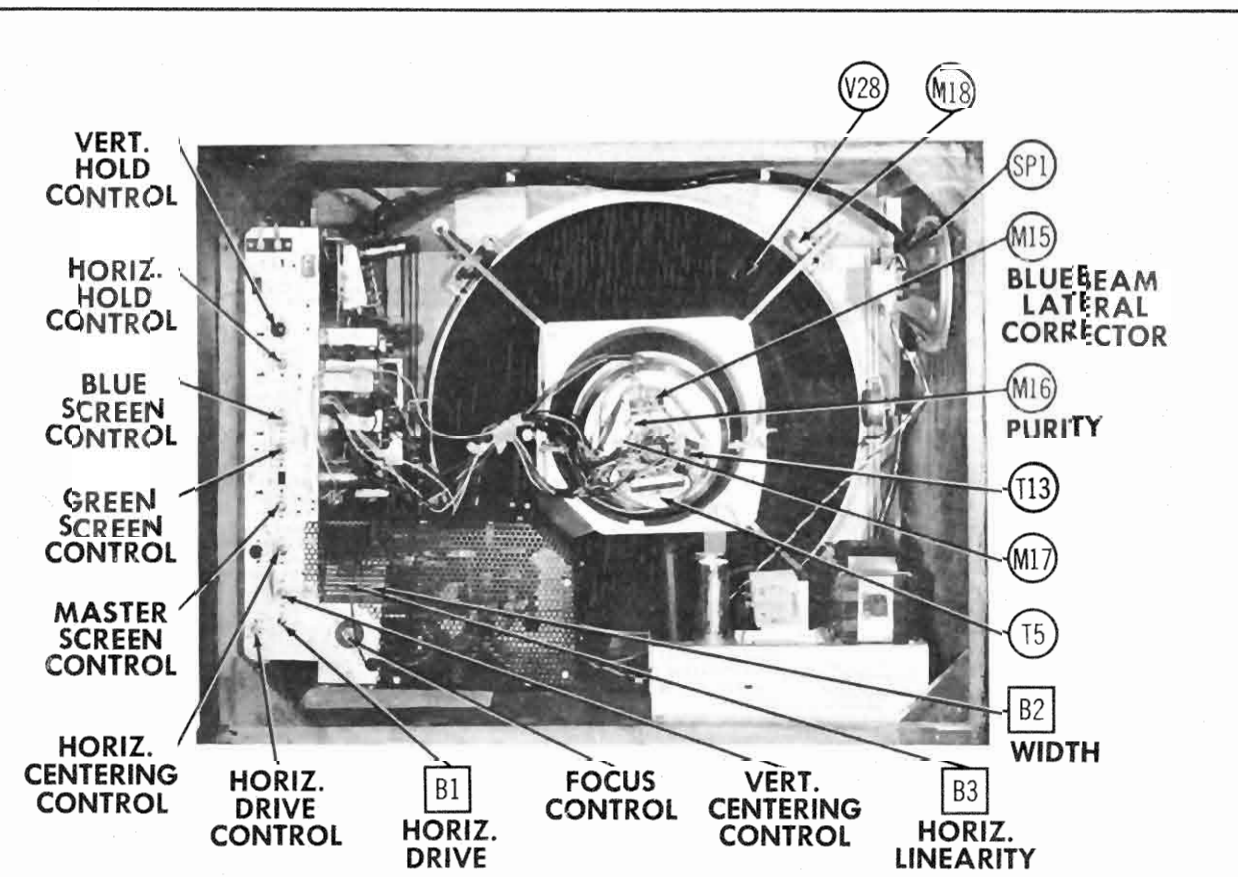
- Connect the DC probe of a VTVM to point  $\diamond$ . Common to chassis. Adjust the reference oscillator plate coil slug (A32) for maximum negative reading on VTVM. Remove VTVM.
- Connect the vertical amplifier of scope to point  $\diamond$ . Low side to chassis. Adjust the bottom slug of the chroma reference oscillator coil (A33) for maximum indication on scope. Turn the top slug of the chroma reference oscillator coil (A34) two turns in either direction. Readjust A33 again for maximum indication on scope. Continue adjusting A33 and A34 until a position of A34 is found that gives maximum indications on scope. Check peak to peak voltage on scope at point  $\diamond$ .
- Connect the vertical amplifier of scope to point  $\diamond$ . Low side to chassis. Check the peak to peak voltage at point  $\diamond$ . It should be the same as at point  $\diamond$ . If necessary repeat step 2. Remove scope.
- Connect a color bar signal generator across antenna terminals. Connect a short clip lead from point  $\diamond$  to chassis. Check color oscillator sync. If necessary adjust A32 until color bias appear to move slowly from one side of the screen to the other. Remove short from point  $\diamond$  and chassis. Color bars should now be in sync.

### BURST COIL ADJUSTMENT

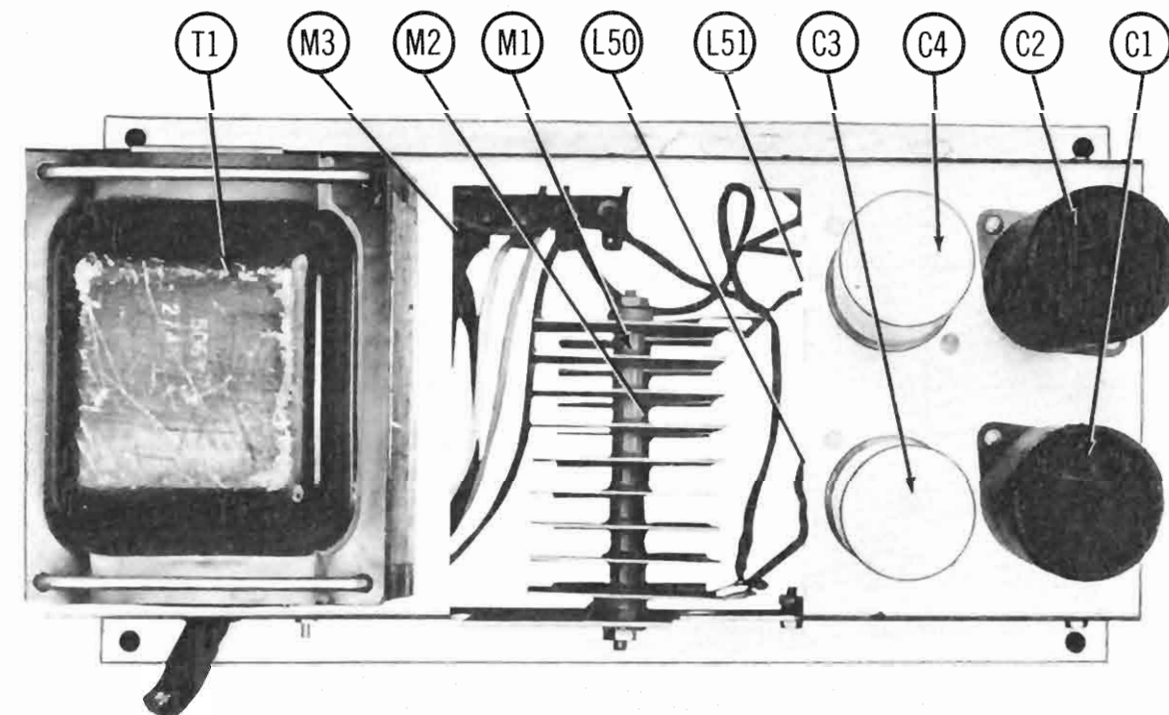
- Connected a color bar generator across antenna terminals. Set the hue control trimmer at one half mesh position. Turn the contrast control fully counterclockwise. Turn the chroma control one half turn from its counterclockwise position. Connect DC probe of VTVM to pin 1 of color phase detector (V24). Common to chassis. Adjust the burst coil slug (A41) for maximum deflection on VTVM.



TUBE PLACEMENT CHART



CABINET-REAR VIEW



POWER SUPPLY CHASSIS  
SET 305 FOLDER II

HOFFMAN MODEL 21M1100A  
(Ch. 703A-21)

## ALIGNMENT INSTRUCTIONS

**ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT**  
The high voltage shock hazard should be eliminated. This may be done by disconnecting pin 3 of horizontal output tube (V18) from chassis and inserting a 200Ω/10Watt resistor from pin 3 of V18 to chassis. Then remove the horizontal multivibrator tube (V17) from its socket.

### VIDEO IF ALIGNMENT

Connect the negative lead of a 3 volt battery to the negative end of C6. Connect the positive lead to chassis. Use only enough signal generator output to provide usable reading on VTVM. Remove the converter tube (V2) from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications. An alternate method of disabling the local oscillator is to place a piece of transparent cellulose tape on the first two contacts (front of drum assembly) of any channel and then switch the tuner to the muted strip.

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1. Direct	High side to an ungrounded tube shield floating over dummy converter tube (V2). Low side to chassis.	4L 25MC (Unmod.)	Any	DC probe thru 10KΩ to point Ⓢ. Common to chassis.	A1	Adjust for MINIMUM deflection.
2. "	"	42.0MC	"	"	A2	Attenuate signal generator output to maintain 1 volt at VTVM. Adjust for maximum deflection.
3. "	"	47.25MC	"	"	A3	Adjust for maximum deflection. Repeat steps 1 thru 3 until no change is noted.
4. "	"	43.6MC	"	"	A4	Attenuate signal generator output to maintain 1 volt at VTVM. Adjust for maximum deflection.
5. "	"	41.4MC	"	"	A5	"
6. "	"	45.3MC	"	"	A6	"
7. "	"	47.25MC	"	"	A7	Adjust for MINIMUM deflection.
8. "	"	41.25MC	"	"	A8	"
9. "	"	46.6MC	"	"	A9	Attenuate signal generator output to maintain 1 volt at VTVM. Adjust for maximum deflection.
10. "	"	43.1MC	"	"	A10	"

### OVERALL VIDEO IF RESPONSE CHECK

Connect bias as under "Video IF Alignment". In steps 12 thru 14 adjust for 4 volts bias, if necessary. remove bias to observe trap markers. If sweep generator has no build in marker, couple a separate marker generator loosely to sweep generator output. Attenuate sweep generator output to provide not more than 6 volts peak to peak on scope. Connect a 68Ω carbon resistor across sweep generator output. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

DUMMY ANTENNA	SWEAP GENERATOR COUPLING	SWEAP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11. .0015MFD	High side thru .0015MFD capacitor to pin 5 (plate) of 3rd Video IF amplifier tube (V3). Low side to chassis.	44.0MC (10MC Swp)	4L 25MC 4L 65MC 45.0MC 47.25MC	Any	Vert. Amp. thru 10KΩ to point Ⓢ. Low side to chassis.	A1, A2, A3	Adjust A2 and A3 for response curve similar to Fig. 1. If necessary slightly retouch A1 to place 4L 25MC trap marker in trap notch as in Fig. 1.
12. "	High side to pin 1 (grid) of 1st Video IF Amplifier tube (V3). Low side to chassis near V3.	"	4L 25MC 4L 65MC 45.0MC 47.25MC	"	"	A4, A5, A6	Increase bias to -4 volts at ungrounded side of C6 and chassis. Attenuate sweep generator output to produce 6 volts peak to peak on scope. Adjust for response curve similar to Fig. 2. A4 affects tilt A5 affects bandwidth on low frequency end, A6 affects high frequency side and position of 45.75MC marker.
13. Direct	High side to an ungrounded tube shield floating over dummy converter tube (V2). Low side to chassis.	"	4L 25MC 4L 65MC 45.75MC 47.25MC	"	Vert. Amp. thru 10KΩ to point Ⓢ to pin 5 (plate) of 1st Video IF amplifier tube (V3). Low side to chassis.	A8, A9, A10	Connect a short clip lead across the 425MC trap coil (L15). Check for response curve similar to Fig. 3. If necessary adjust A9 and A10 for desired response. Slightly retouch A8 to place 4L 25MC marker in trap notch as in Fig. 3. Remove short from (L15).
14. "	"	"	4L 25MC 4L 65MC 45.0MC 47.25MC	"	Vert. Amp. thru 10KΩ to point Ⓢ. Low side to chassis.	"	Check for overall IF response curve similar to Fig. 4. If necessary slightly retouch A4, A5, and A6 for desired response. Check position of 4L 25MC and 47.25MC traps. If necessary increase generator output and slightly retouch A1 (4L 25MC) and A7 (47.25MC) to place markers in trap notches as in Fig. 4. Replace original 6J6 in its socket.

### SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
15. .005MFD	High side to point Ⓢ. Low side to chassis.	4.5MC (Unmod.)	Any non-interfering channel	DC probe to point Ⓢ. Common to chassis.	A11, A12, A13	Adjust for maximum deflection.
16. "	"	"	"	DC probe to point Ⓢ. Common to chassis.	A14	"
17. "	"	"	"	DC probe to point Ⓢ. Common to chassis.	A15	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Repeat steps 16 and 17.

### SOUND IF ALIGNMENT USING TV SIGNAL AND VTVM

Disconnect test equipment. Connect antenna to antenna terminals. Tune in a TV station and adjust for best picture.

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
15. Not used	Not used. Tune in a TV signal.	Not used	Any station available	DC probe to point Ⓢ. Common to chassis.	A11, A12, A13	Adjust for maximum deflection.
16. "	"	"	"	DC probe to point Ⓢ. Common to chassis.	A14	"
17. "	"	"	"	DC probe to point Ⓢ. Common to chassis.	A15	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Repeat steps 16 and 17. Remove VTVM and adjust A15 for best program sound and MINIMUM buzz.

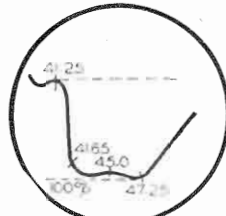


FIG. 1

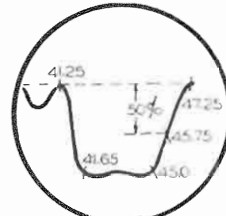


FIG. 2

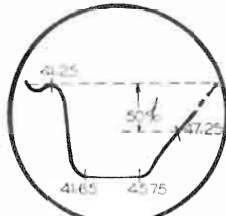


FIG. 3

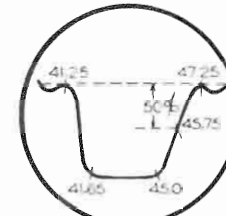


FIG. 4

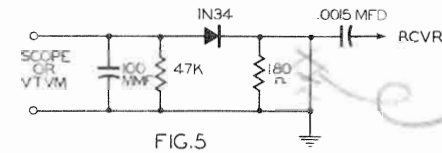


FIG. 5

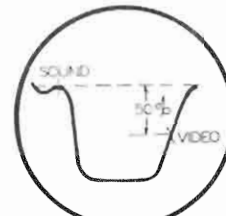


FIG. 6

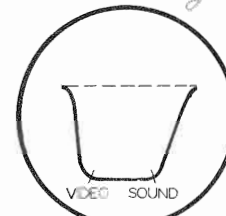


FIG. 7

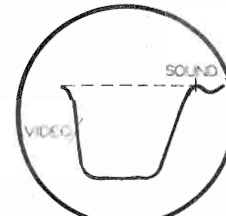


FIG. 8

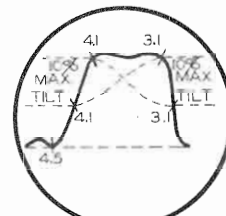


FIG. 9

### OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket or remove cellulose tape from inner strip. The channel oscillator adjustments screws are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible thru this hole as the channel switch is turned to each channel. Use only enough sweep generator output to provide usable pattern on scope. Leave bias connected as under "Overall Video IF Response Check" and connect a jumper from grounded side of C6 to tuner AGC terminal. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms. Set the fine tuning control to the mid-position of its range.

DUMMY ANTENNA	SWEAP GENERATOR COUPLING	SWEAP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
18. Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp) 207MC (10MC Swp) 201MC (10MC Swp) 195MC (10MC Swp) 189MC (10MC Swp) 183MC (10MC Swp) 177MC (10MC Swp) 171MC (10MC Swp) 165MC (10MC Swp) 159MC (10MC Swp) 153MC (10MC Swp) 147MC (10MC Swp) 141MC (10MC Swp) 135MC (10MC Swp) 129MC (10MC Swp) 123MC (10MC Swp) 117MC (10MC Swp) 111MC (10MC Swp) 105MC (10MC Swp) 99MC (10MC Swp) 93MC (10MC Swp) 87MC (10MC Swp) 81MC (10MC Swp) 75MC (10MC Swp) 69MC (10MC Swp) 63MC (10MC Swp) 57MC (10MC Swp) 51MC (10MC Swp)	211.25MC 215.75MC 205.25MC 209.75MC 199.25MC 203.75MC 193.25MC 197.75MC 187.25MC 191.75MC 181.25MC 185.75MC 175.25MC 179.75MC 169.25MC 173.75MC 163.25MC 167.75MC 157.25MC 161.75MC 151.25MC 155.75MC 145.25MC 149.75MC 139.25MC 143.75MC 133.25MC 137.75MC 127.25MC 131.75MC 121.25MC 125.75MC 115.25MC 119.75MC 109.25MC 113.75MC 103.25MC 107.75MC 97.25MC 101.75MC 91.25MC 95.75MC 85.25MC 89.75MC 79.25MC 83.75MC 73.25MC 77.75MC 67.25MC 71.75MC 61.25MC 65.75MC 55.25MC 59.75MC	13 12 11 10 9 8 7 6 5 4 3 2	Vert. Amp. thru 10KΩ to point Ⓢ. Low side to chassis.	A16 A17 A18 A19 A20 A21 A22 A23 A24 A25 A26 A27	Adjust to place sound marker as in Fig. 6. Video marker should be at 50%.

### RF AND MIXER ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

DUMMY ANTENNA	SWEAP GENERATOR COUPLING	SWEAP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
19. Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. Amp. thru 10KΩ to point Ⓢ. Low side to chassis.	A28, A29, A30	Adjust for response similar to Fig. 7 with markers above 90%.
20. "	"	213MC (10MC Swp) 207MC (10MC Swp) 201MC (10MC Swp) 195MC (10MC Swp) 189MC (10MC Swp) 183MC (10MC Swp) 177MC (10MC Swp) 171MC (10MC Swp) 165MC (10MC Swp) 159MC (10MC Swp) 153MC (10MC Swp) 147MC (10MC Swp) 141MC (10MC Swp) 135MC (10MC Swp) 129MC (10MC Swp) 123MC (10MC Swp) 117MC (10MC Swp) 111MC (10MC Swp) 105MC (10MC Swp) 99MC (10MC Swp) 93MC (10MC Swp) 87MC (10MC Swp) 81MC (10MC Swp) 75MC (10MC Swp) 69MC (10MC Swp) 63MC (10MC Swp) 57MC (10MC Swp) 51MC (10MC Swp)	211.25MC 215.75MC 205.25MC 209.75MC 199.25MC 203.75MC 193.25MC 197.75MC 187.25MC 191.75MC 181.25MC 185.75MC 175.25MC 179.75MC 169.25MC 173.75MC 163.25MC 167.75MC 157.25MC 161.75MC 151.25MC 155.75MC 145.25MC 149.75MC 139.25MC 143.75MC 133.25MC 137.75MC 127.25MC 131.75MC 121.25MC 125.75MC 115.25MC 119.75MC 109.25MC 113.75MC 103.25MC 107.75MC 97.25MC 101.75MC 91.25MC 95.75MC 85.25MC 89.75MC 79.25MC 83.75MC 73.25MC 77.75MC 67.25MC 71.75MC 61.25MC 65.75MC 55.25MC 59.75MC	13 12 11 10 9 8 7 6 5 4 3 2	"	"	If markers fall below 70% on any channel make compromise adjustment of A28, A29 and A30 with channel switch set to that channel, then check all other channels to see that they have not been seriously affected.

### 44MC IF TRAP ADJUSTMENT

The IF trap (Adjustment A31) is for the purpose of eliminating any interference in the IF range. Tune to the channel on which interference is noted and adjust A31 for minimum interference on the picture tube screen. Check to see that reception on channel 2 has not been affected.

### OVERALL VIDEO IF AND TUNER RESPONSE CHECK

Connect bias as under "Overall Video IF response check" and connect a jumper from ungrounded side of C6 to tuner AGC terminal. Use only enough sweep generator output to provide usable pattern on scope. Connect a 68Ω carbon resistor across sweep generator output. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

DUMMY ANTENNA	SWEAP GENERATOR COUPLING	SWEAP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
21. Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. Amp. thru 10KΩ to point Ⓢ. Low side to chassis.	"	Check for response curve similar to Fig. 8. If necessary SLIGHTLY retouch A4, A5 and A6 for desired response.

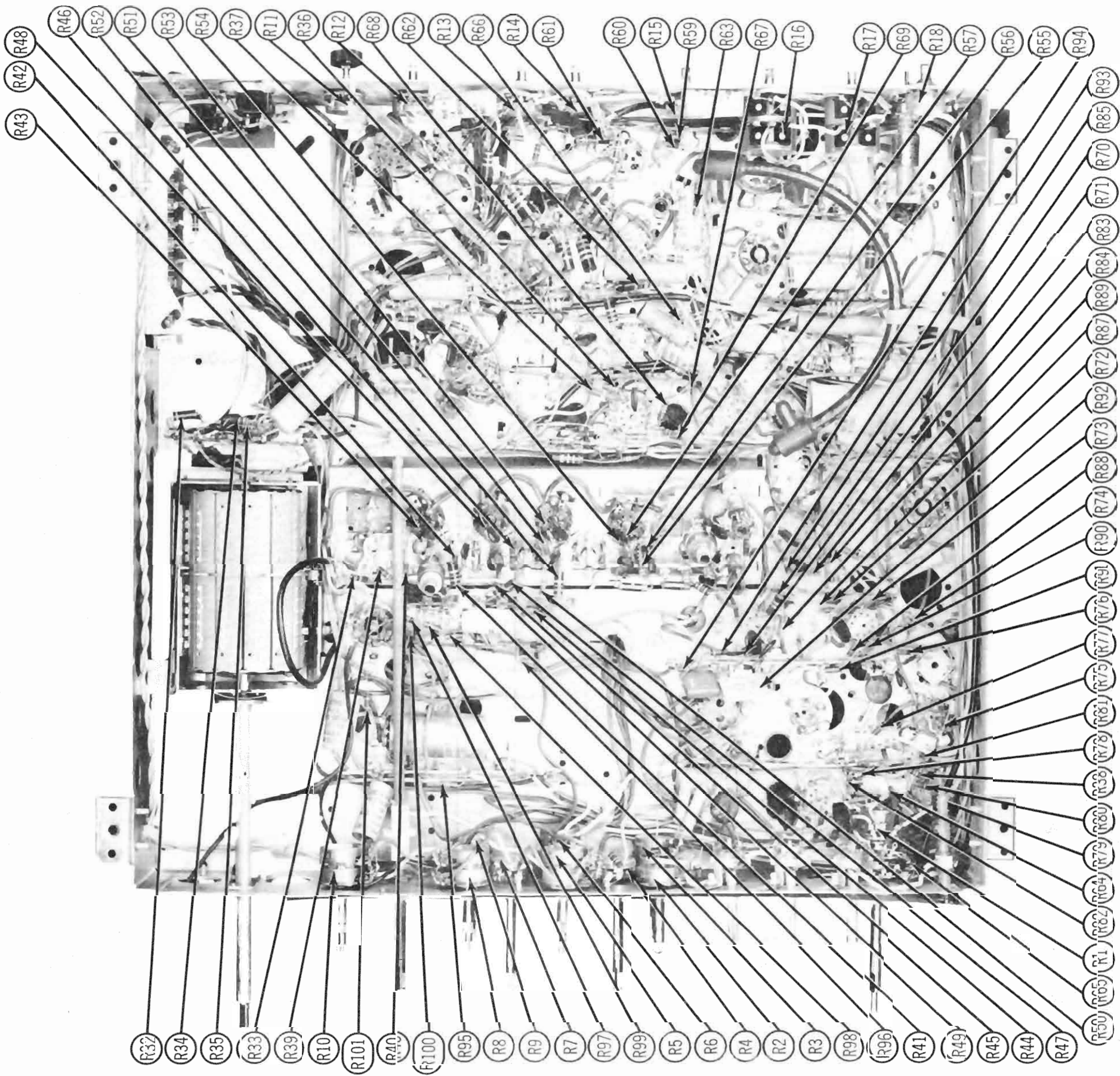
### CHROMA BANDPASS AMPLIFIER ALIGNMENT

Remove the chroma reference oscillator tube (6UR/V26) from its socket. Connect a short clip lead from pin 2 of color killer tube (V18) to chassis. Connect the negative lead of a 5 volt bias supply to point Ⓢ. Positive lead to chassis. Replace V17 in its socket. Remove 220Ω/10 Watt resistor from pin 3 of V18 and reconnect pin 3 of V18 to chassis.

DUMMY ANTENNA	SWEAP GENERATOR COUPLING	SWEAP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
22. 3.9KΩ Carbon Resistors	High side to point Ⓢ. Low side to chassis.	Not used	4.5MC (Unmod)	Any	Use VTVM. DC probe to pin 1 (cathode) of color phase detector tube (V24B). Common to chassis.	A35, A36	Attenuate signal generator output to maintain not more than 5 volts on VTVM. Adjust for MINIMUM deflection. Retouch A11 for MINIMUM.
23. "	"	"	4.1MC	"	"	A36	Adjust for maximum deflection.
24. "	"	"	3.0MC	"	"	A37	"
25. "	"	"	"	"	"	"	Connect a .05MFD capacitor from pin 2 of 1st. chroma amplifier (V18B) to chassis. Replace V26 in its socket. Connect vertical amplifier of scope to point Ⓢ. Low side to chassis. Adjust A38 for minimum amplitude of hash on scope, then adjust the 2nd. chroma amplifier screen bypass trimmer (A39) for MINIMUM hash. Repeat adjustments of A36 and A39 until a position of A36 is found with minimum hash. Remove .05MFD from pin 2 of V18B.
26. 3.9KΩ Carbon Resistor	High side to point Ⓢ. Low side to chassis.	3MC (10MC Swp)	3.1MC 4.1MC 4.5MC	Any	Vert. Amp. thru detector (Fig. 5) to pin 8 of R-Y demodulator (V27B). Low side to chassis.	"	Couple a marker generator loosely to pin 2 of V18B (1st. chroma amp. tube). Remove V26 from its socket. Check for response curve similar to Fig. 9. If necessary, SLIGHTLY retouch A36 and A37 for desired response.

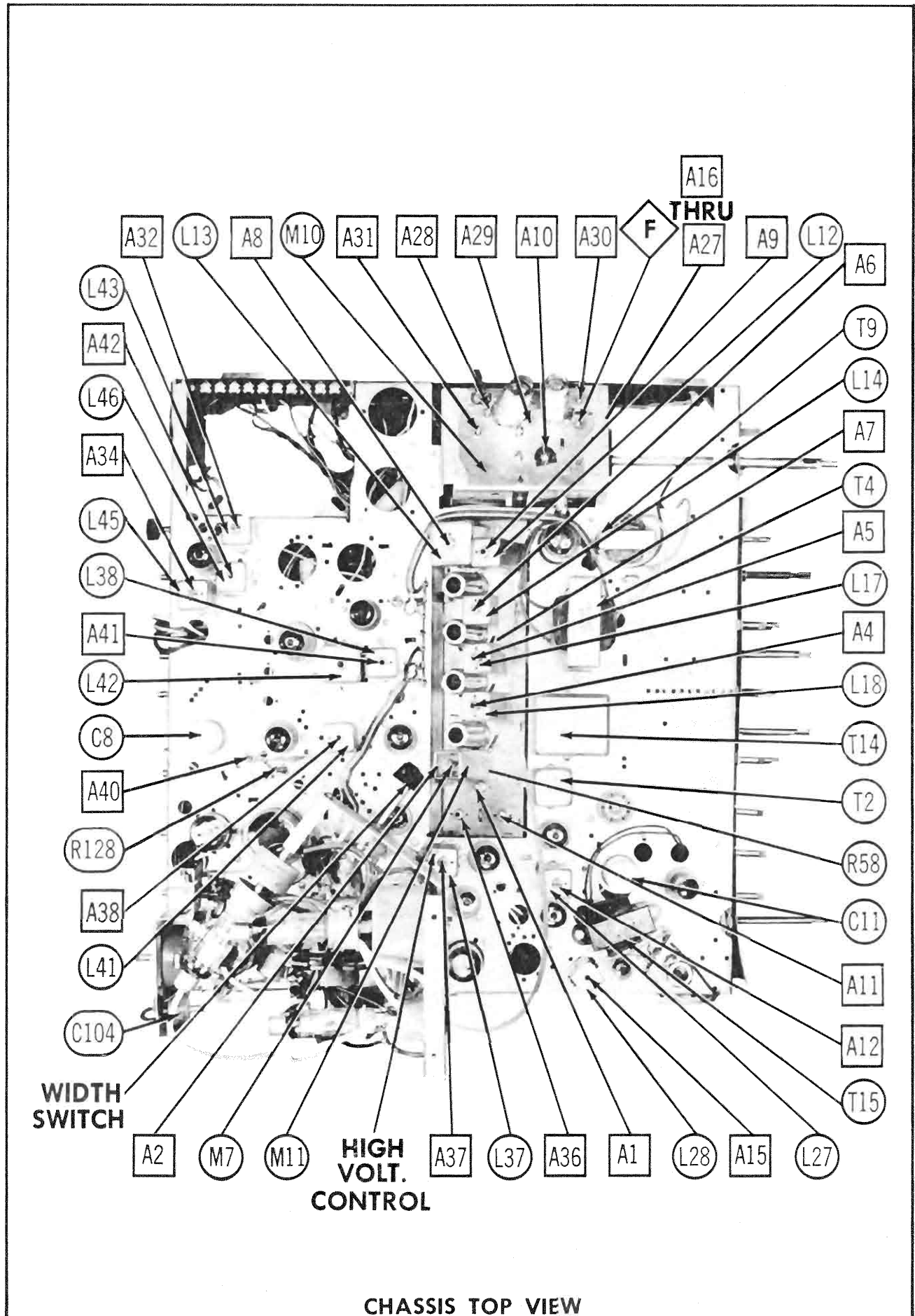
HOFFMAN MODEL 21M1100A  
(Ch. 703A-21)



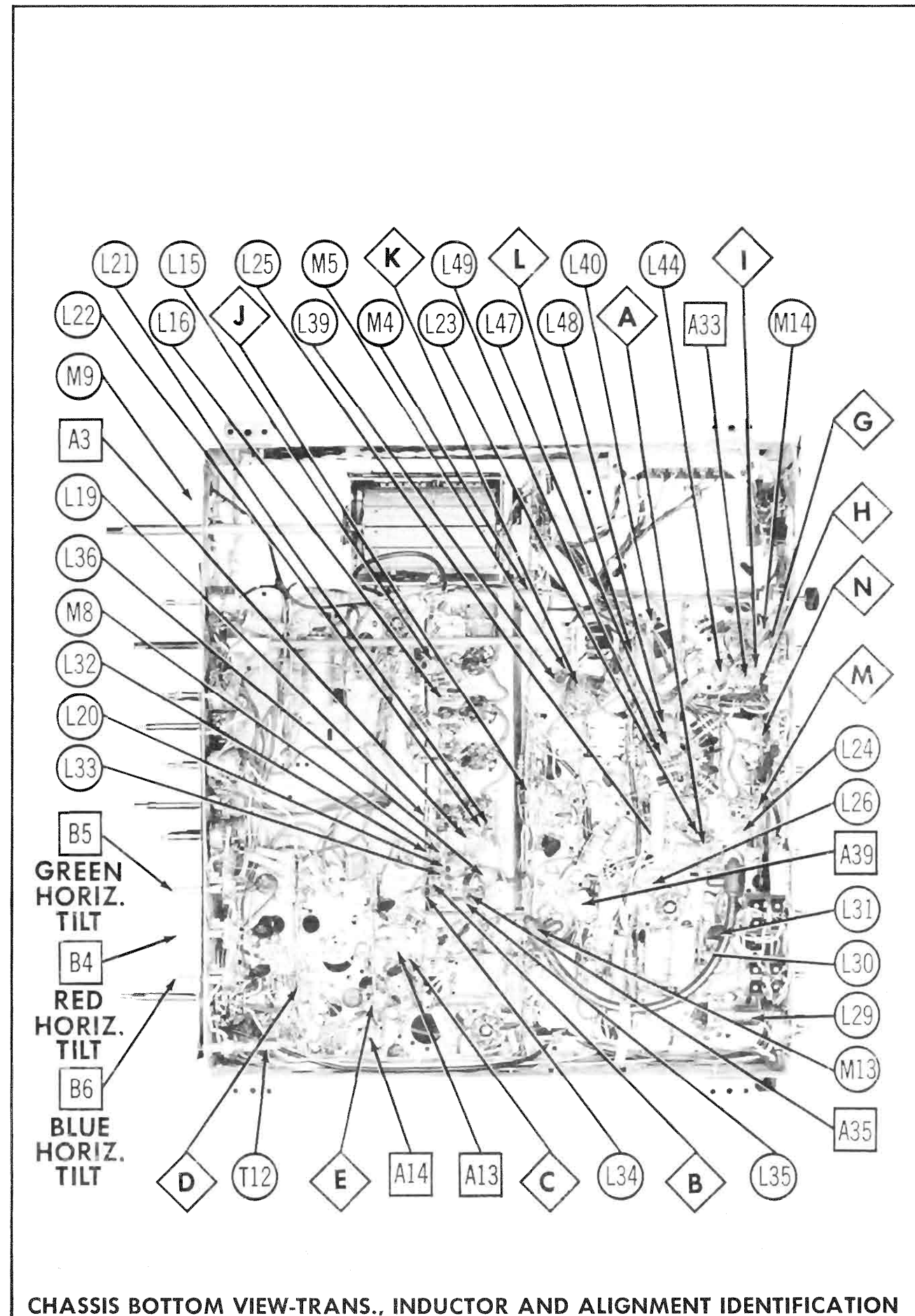


CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION (R1 - R101)  
 (Ch. 703A-21)

HOFFMAN MODEL 21MT100A

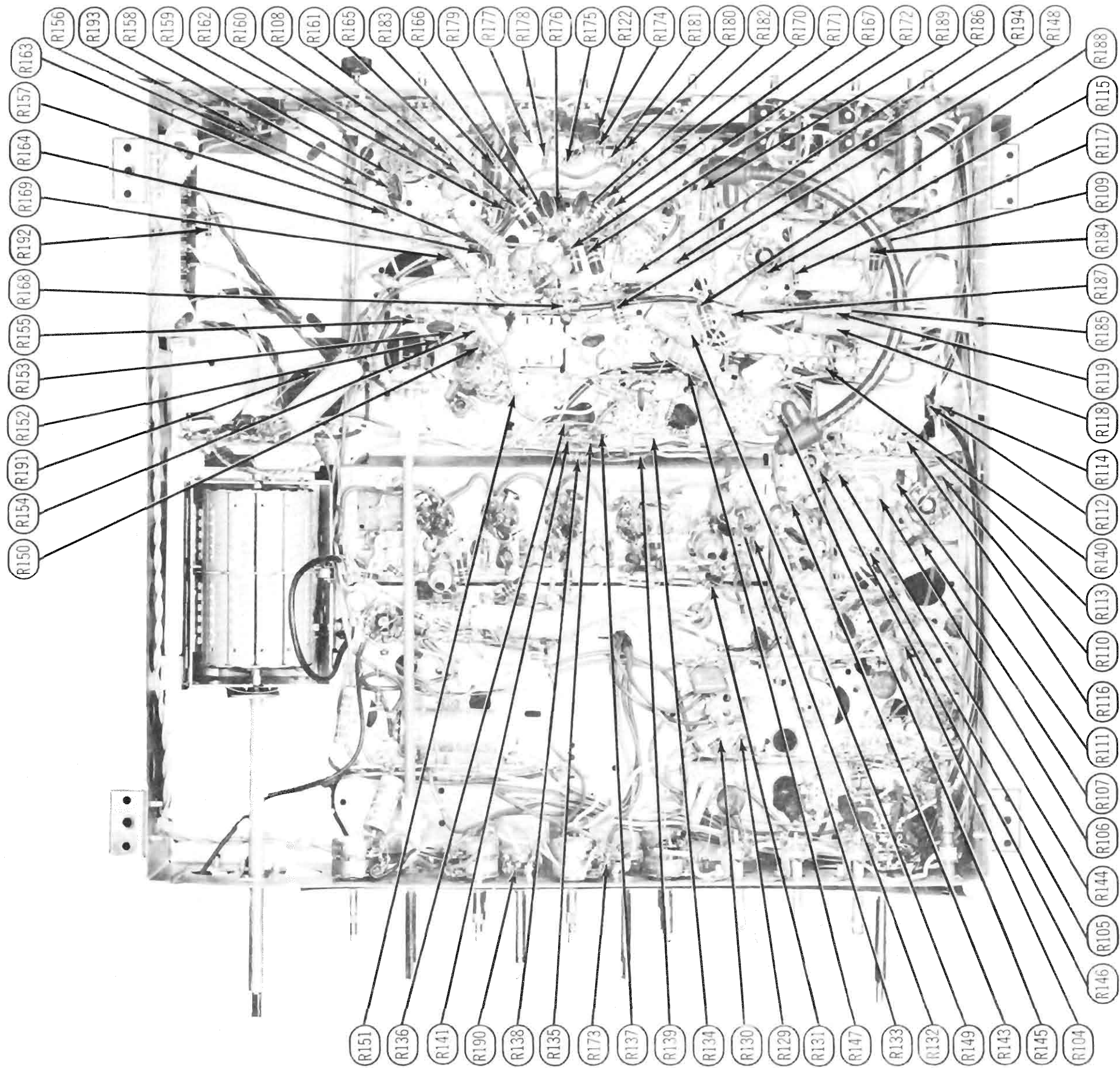


CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

HOFFMAN MODEL 21M1100A  
(Ch. 703A-21)



CHASSIS-BOTTOM VIEW-RESISTOR IDENTIFICATION (R104 -R194)

HOFFMAN MODEL 21M1100A  
(Ch. 703A-21)

## MISCELLANEOUS ADJUSTMENTS

### R-Y AND B-Y BALANCE ADJUSTMENT

Connect a color signal generator, providing +R-Y and +B-Y signals across antenna terminals. Connect the vertical amplifier thru a low capacity probe to point  $\odot$ . Low side to chassis.

Set the hue control trimmer at one half mesh position. Adjust A41 for zero B-Y signal indication on scope. Move the scope to point  $\odot$ . Adjust A42 for zero R-Y signal indication on scope. Move scope back to point  $\odot$  and recheck A41 for zero indication of B-Y signal on scope.

Check all three color signals R-Y, B-Y and G-Y. With the hue control trimmer at one half mesh position the color bias should appear in their proper ratio. (Fig. 10).

### HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Turn the horizontal drive control (R18) as far as possible without the presence of vertical white lines or compression near the center of the picture.

Adjust the horizontal centering control (R16) to center picture preferably while viewing a test pattern.

Set the horizontal hold control to its mid-range position.

Adjust the horizontal AFC slug (B1) counterclockwise while switching on and off channel until the picture loses sync. Turn B1 clockwise and note the number of diagonal bars just before the picture pulls into sync. There should be less than two bars if the horizontal section is operating properly. Continue turning B1 clockwise while switching on and off channel, until sync is lost again, then turn B1 counterclockwise and not the point where picture pulls into sync. Turn B1 an additional half turn counterclockwise. Adjust the horizontal width slug (B2) for a picture slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity slug (B3) for a picture that is symmetrical from left to right.

### HIGH VOLTAGE ADJUSTMENTS

Connect a 0-1MA milliammeter across the cathode regulator resistor (R128). One side of R128 is connected to pin 1 of V23 and the other side to B-. Set the contrast control the brightness control fully counterclockwise. Adjust the high voltage control (R20) for a reading of .7MA on meter. The maximum high voltage rating is 25KV. Remove milliammeter.

### COLOR PURITY ADJUSTMENT

Set the six magnets on the field equalizing assembly to their maximum counterclockwise positions.

Connect a signal from a dot pattern generator across the antenna terminals. Make certain the horizontal sweep circuit adjustments are correct. Adjust the 3 beam positioning magnets (located on dynamic convergence yoke assembly T13A, B and C) and the blue lateral corrector magnet (M15) (located around neck of tube) for convergence of the three beams (red, green and blue) at the center of the picture tube.

Remove any signal to the receiver and make the blue and green guns inoperative by turning the green and blue difference and the blue and green screen controls fully counterclockwise. Adjust the brightness control for a brighter than normal raster. Loosen the four screws that hold the cradle to allow movement of the yoke. If set has previously been adjusted for purity, a slight adjustment of yoke position should be sufficient. Note position and location of the purity magnet (M16), it consists of two magnetic rings between the blue corrector magnet and the dynamic convergence coils. Adjust to position tabs of one ring opposite the tab of the other ring until minimum strength magnetic field is produced. When correct tabs of the purity device are opposite each other, rotating both rings together should have no effect on the screen. If incorrect, position tabs on magnetic rings to place the tabs adjacent to each other. To check purity at the center of the screen, separate the tabs slightly to produce a weak

magnetic field. Rotate the purity magnet to obtain best red purity in center of the screen. Continue adjusting the field strength with position of purity magnet tabs until the red purity is best in center portion of the screen. Move the yoke slightly backward or forward until best red purity is obtained with minimum color contamination of the red field. Tighten yoke. Adjust the six magnets on the field equalizing assembly for the best overall purity over the entire screen. Adjustment of the magnets will have the most effect near the edges of the screen.

### DYNAMIC CONVERGENCE ADJUSTMENTS

Connect a signal from a dot generator across the antenna terminals. Center the dots on the screen by adjusting the vertical and horizontal centering controls. Adjust the brightness of each beam so that each color dot is easily observed using the screen and difference controls. If necessary adjust the focus control. If necessary adjust the 3 beam positioning magnets and the blue beam lateral magnet (M15) for best convergence at center of the screen. Note which of the three dots require positioning. In Fig. 11 the dashed lines indicate the direction of dot movement by its associated beam positioning magnet. The solid line indicate the direction of blue dot movement by adjusting the blue beam lateral corrector magnet. Each magnet has a slight effect on the two beams other than the one it is intended to control. For this reason minimum adjustment of the magnet is essential. Complete convergence is indicated when a single white dot with no color fringing around its edge is obtained.

### HORIZONTAL DYNAMIC CONVERGENCE ADJUSTMENTS

Leave dot pattern generator connected as under "Dynamic Convergence Adjustments". Select one horizontal row of dots near center of the screen. Adjust the red and green horizontal amplitude controls and the red and green tilt trimmer (B4, B5) so that the red and green dots are symmetrically spaced with respect to each other along a horizontal row from left to right near center of the screen. The dots should be kept in focus. Adjust the red and green beam positioning magnets for convergence of the red and green dots horizontally. Adjust the blue horizontal amplitude control and the blue tilt trimmer (B6) until the blue dots are symmetrically spaced away from the superimposed red and green dots in horizontal dot group. Adjust the three beam positioning magnets for convergence of the blue, red and green dots horizontally.

### VERTICAL DYNAMIC CONVERGENCE ADJUSTMENT

Leave dot generator connected as under "Dynamic Convergence Adjustments". Choose a vertical column of dots near the center of the screen. Notice that these dots are converged near the center of the screen and become over converged away from the center of the screen toward top and bottom. Adjust the red, green and blue vertical amplitude and tilt controls to form similar triangle groups along a vertical line near center of the screen. Adjust the three beam positioning magnets to converge the red, green and blue triangle groups along a straight vertical line near center of the screen. Check purity and if necessary adjust the blue beam lateral corrector magnet and the three beam positioning magnets for best overall convergence.

### BACKGROUND AND SCREEN CONTROL ADJUSTMENTS

Turn the set on and set the contrast chroma controls fully counterclockwise. Set the brightness control fully clockwise. Set the master screen control approximately 1/4 turn from fully clockwise position. Set the blue and green screen controls 1/4 turn from fully clockwise. Adjust the blue and green difference controls until the raster appears grey (less white). If necessary readjust the screen controls.

Select a station transmitting a black and white test pattern and adjust the contrast and brightness controls for a low brightness signal. Adjust the blue and green difference controls for a gray (less white) picture. If when adjusting the brightness control a color start to tint the screen, adjust the screen control corresponding to this color until the bright portions are white or grey again. Readjust the brightness control for normal brightness. Reset the difference controls so that brightness portions of picture appear white. Repeat the above procedure until minimum tinting occurs over the usable range of the brightness control.

## PARTS LIST AND DESCRIPTIONS (Continued)

### SELENIUM RECTIFIER

ITEM No.	RATING CURRENT	REPLACEMENT DATA					NOTES
		HOFFMAN PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	
M1	.430ADC	10019	119A	9RS500SL	98750D		① Drill new mounting hole.
M2	.280ADC	10020	117A	9RS300SL	98750D		

### FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA				
			HOFFMAN PART No.	LITTELFUSE PART No.	BUSS PART No.		
M3			3/8" Piece #26 Wire				
M4			2 3/4" Piece #26 Wire				
M5			2 3/4" Piece #26 Wire				
M6	3AG	1/2A 250V		312.500 (3AG 1A)	357001	AGC 1/2	4405

### CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		HOFFMAN PART No.	SYLVANIA PART No.	
M7	CK706A		1N60	Luminance Detector
M8	CK706A		1N60	Chroma Detector

### MISCELLANEOUS

ITEM No.	PART NAME	HOFFMAN PART No.	NOTES
M9	Dial Light	9505	#44
M10	Tuner	9860	
M11	Luminance Det. Assy.	5299A	
M12	Switch	8047	
M13	Delay Line	10018	
M14	Crystal		
M15	Magnet		
M16	Magnet		
M17	Magnetic Shield		
M18	Rim Purity Magnet Assy. Variable Trimmer (Air)	4421	
A39	Trimmer Cap.	4426	Hue (5-25MMF)
B4	Trimmer Cap.	4426	2nd Chroma amp. screen bypass (70-780MMF)
B5	Trimmer Cap.	4426	Red horiz. tilt (25-280MMF)
B6	Trimmer Cap.	4426	Green horiz. tilt (25-280MMF)
			Blue horiz. tilt (25-280MMF)

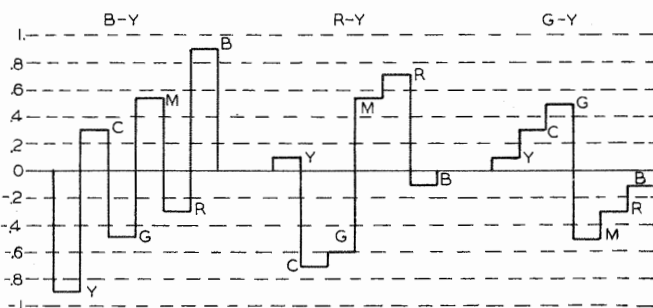


FIG. 10

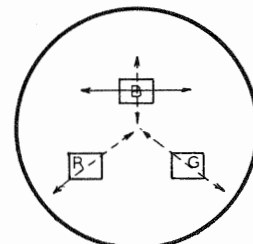
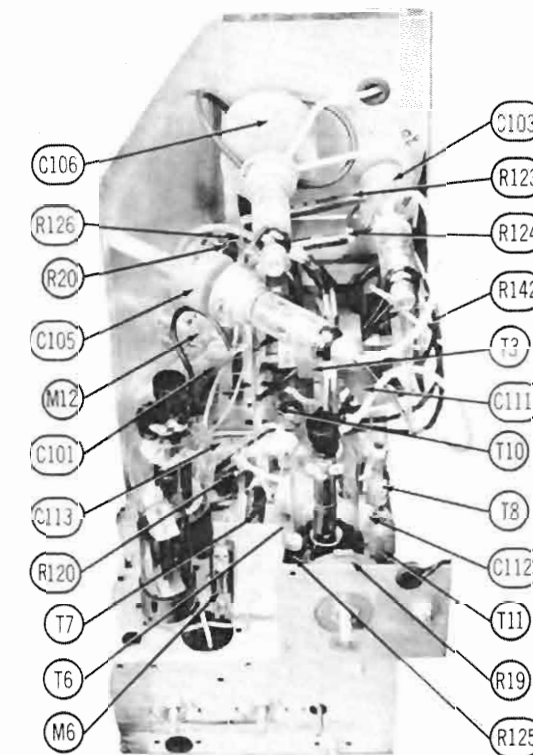


FIG. 11



HIGH VOLTAGE COMPARTMENT

HOFFMAN MODEL 21M100A  
(Ch. 703A-21)

## PARTS LIST AND DESCRIPTIONS (Continued)

### SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	HOFFMAN	QUAM	
				PART No.	PART No.	
SPL	6 1/2 x 10-5/8	PM	3.4Ω	H-9079		

### COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	HOFFMAN	MEISSNER	MERIT	MILLER	
				PART No.	PART No.	PART No.	PART No.	
L1	IF Trap	0Ω						Wound on cap.
L2	IF Trap	0Ω						Wound on cap.
L3	Ant. Coils	0Ω CT	0Ω					
L4	IF Trap Coil	1Ω						
L5	Fl. Choke	0Ω						
L6	Neut. Coil	0Ω						
L7	RF Mixer Grid & Osc. Coils	0Ω						
L8	Fl. Choke	0Ω						
L9	Feedback Coil	1.5Ω						
L10	RF Coil	0Ω						
L11	Conv. Plate	.1Ω						
L12	1st. Video IF	.3ΩCT		5296A				Includes 9MMF cap.
L13	41.25MC Trap	0Ω		5291A				Includes caps & resistors
L14	2nd. Video IF	0Ω		5317A				
L15	47.25MC Trap	0Ω		5316A				Tapped
L16	RF Coil	2.2Ω		5290A	19-1005		4612	10 Microhenries
L17	3rd. Video IF	.1Ω	.1Ω	5297A	17-5002	TV-127	6232	
L18	4th. Video IF	.1Ω	.1Ω	5297A	17-5004	TV-125	6234	
L19	RF Choke	1.7Ω		5269A	19-1005		4612	10 Microhenries
L20	41.25MC Trap	0ΩCT		5324A				
L21	Series Peak-ing Coil	1Ω		5267A	19-1003		4608	4.7 Microhenries
L22	Series Peak-ing Coil	14Ω		5433	19-3160	TV-184	4644	150 Microhenries, wound on 39KΩ resistor
L23	3.58MC Trap	.8ΩCT		5282A				
L24	Shunt Peak-ing Coil	10Ω		5276A	19-3250	TV-185	6181	230 Microhenries
L25	Series Peak-ing Coil	11Ω		5313A	19-3250	TV-185	6181	255 Microhenries, wound on 100KΩ resistor
L26	Shunt Peak-ing Coil	11Ω		5314A	19-3300	TV-185	6130	280 Microhenries
L27	2nd. Sound IF	6.3Ω	3.7Ω	5593-1	16-3445	TV-113	6203	
L28	Ratio Det.	17Ω	1.6ΩCT	5252A	17-3497	TV-115	6205	Tertiary winding-.6Ω
L29	Horiz. Osc.	65Ω		5447	19-1576	TV-163	6210	
L30	RF Choke	1.8Ω		5268A	19-1005		4612	8.2 Microhenries
L31	RF Choke	.9Ω		5323A	19-6033		4628	33 Microhenries
L32	RF Choke	1.8Ω		5269A	19-1005		4612	10 Microhenries
L33	Series Peak-ing Coil	1Ω		5267A	19-1003		4608	4.7 Microhenries
L34	1st. Sound IF	.9ΩCT	2.3Ω	5300A				
L35	1st. Chroma Amp. Coil	3.3Ω		5301A				
L36	RF Coil	30Ω		5266A	19-4950		4652	Includes 4.5MC trap 1 Microhenry
L37	Chroma Inter-stage Coil	4.2Ω	2.9Ω	5302A				
L38	Burst Take-off Trans.	2.8ΩCT		5289A				
L39	7.10MC Trap	1.5Ω		5320A				
L40	Series Peak-ing Coil	3.5Ω			19-3036	TV-180	6176	39 Microhenries
L41	Chroma Amp. Plate Coil	5.7Ω		5288A				
L42	Chroma Amp. Output Trans.	3.4Ω	3.4Ω*	5303A				*Tapped @ 2.4Ω
L43	Reference Osc. Plate Coil	5Ω		5291A				
L44	Shunt Peak-ing Coil	30Ω		5266A	19-4950		4652	1 Microhenry
L45	Chroma Ref. Osc. Coil	3Ω		5304A				Note 1
L46	Demodulator Grid Coil	1.3Ω		5292A				Tapped @ .6Ω
L47	Series Peak-ing Coil	30Ω		5328A	19-4950		4652	1 Microhenry
L48	Series Peak-ing Coil	30Ω		5328A	19-4950		4652	1 Microhenry
L49	Series Peak-ing Coil	30Ω		5328A	19-4950		4652	1 Microhenry

■ Use adaptor plate and detune trap.  
 ▲ Use adaptor plate.  
 ◆ Parallel with 39KΩ resistor.  
 ▲ Parallel with 100KΩ resistor.  
 Note 1. Secondary 1 - .7Ω (tuned), Secondary 2 - 1.2Ω, Secondary 3 - .7Ω.

### FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 C)	HOFFMAN PART No.	Helldorson PART No.	Merit PART No.	Stoncor PART No.	Thordarson PART No.	Triad PART No.
L50	290ADC	43Ω	2.1HY	5135A	C5037	C-2996	C-2326	26C44 ①	C-17X
L51	140ADC	43Ω	2.1HY	5135A	C5037	C-2996	C-2326	26C44 ①	C-17X

① Drill one new mounting hole.

## PARTS LIST AND DESCRIPTIONS

### TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA			RETMA BASE TYPE	NOTES
		HOFFMAN	STANDARD			
		PART No.	REPLACEMENT			
V1	RF Amplifier	6BQ7A	6BQ7A		9AJ	
V2	Mixer-Osc.	6J6	6J6		7BF	
V3	1st. Video IF Amp.	6DC6	6DC6		7CM	
V4	2nd. Video IF Amp.	6DC6	6DC6		7CM	
V5	3rd. Video IF Amp.	6DC6	6DC6		7CM	
V6	4th. Video IF Amp.	6CB6	6CB6		7CM	
V7	Video Output	12BY7	12BY7		9BF	
V8	AGC Keying-Color Killer	6AN8	6AN8		9DA	
V9	1st. Sound IF Amp. Vert. Oscillator	6U8	6U8		9AE	
V10	2nd. Sound IF Amp. Sync Phase Inv.	6U8	6U8		9AE	
V11	Ratio Detector	6AL5	6AL5		6BT	
V12	AF Amplifier-AGC Clamper	6AV6	6AV6		7BT	
V13	Audio Output	6AQ5	6AQ5		7BZ	
V14	Sync Separator-1st. Chroma Amp.	6U8	6U8		9AE	
V15	Vert. Output	6BL7GT	6BL7GT		8BD	
V16	Horiz. AFC	6AL5	6AL5		6BT	
V17	Horiz. Mult.	6SN7GT	6SN7GT		8BD	
V18	Horiz. Output	6CB5	6CB5		8GD	
V19	Damper	6AU4GT	6AU4GT		4CG	6BL4 used as an alternate
V20	HV Rectifier	3A2	3A2		9DT	
V21	Diode Coupler	3A2	3A2		9DT	
V22	HV Doubler	3A2	3A2		9DT	
V23	Voltage Regulator	6BK4	6BK4		6CG	
V24	Burst Keying - Chroma Sync Phase Detector	6BJ7	6BJ7		9AX	
V25	2nd. Chroma Amp.	6CL6	6CL6		9BV	
V26	Chroma Reference Osc. Control-Chroma Ref. Osc.	6U8	6U8		9AE	
V27	B-Y Demodulator - R-Y Demodulator	12BH7	12BH7		9A	

### CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA					RETMA BASE TYPE	NOTES
	HOFFMAN PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.		
V28	2IAXP22			2IAXP22		14W	

### ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	HOFFMAN PART No.	MALORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1	200	300	4278		TM-200-250	T-115	
C2	200	300	4278		TM-200-250	T-115	
C3	90	475	4217A	FP187	TM-90-475	S-305	
C4	200	300	4216A		TM-200-250		
C5	1000	15	4223A		TD-1000-15	S-020	
C6	2	25	4220A	TC302	TD-2-25	MMT-0505	
C7	5	25	4232A	TC30	TD-5-25	MMT-0505	
C8A	▲10	450	4213A	FP231	TM-D10-450	D-200	
C8B	▲10	450					
C9	4	150	4219A	TC40	TD-4-150	FM-1504	
C10	4	50	4221A	TC30	TD-4-50	MMT-0505	
C11A	▲10	450	4214A	FP375.8	TM-T10-450	T-125	
C11B	▲10	450					
C11C	10	450					
C12	4	50	4237A		TD-4-50NP	FM-0510 * FM-0510	Note 1 Note 2
C13	25	50	4224A	TC36	TD-25-50	FM-0525	
C14	10	25	4218A	TC22	TD-10-25	FM-0210	Note 3
C15	500	3	4222A		TD-500-3NP	MTM-06100 * MTM-06100	Note 2
C16	10	25	4218A	TC22	TD-10-25	FM-0210	
C17	10	25	4218A	TC22	TD-10-25	FM-0210	
C18	4	150	4219A	TC40	TD-4-150	FM-1504	

Note 1. C11C is not used.  
 Note 2. Non-polarized unit.  
 Note 3. Some versions may use a non-polarized unit in this application (part #4236A).  
 \* Connect negative leads together.

### FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	HOFFMAN PART No.	CENTRAL LAB PART No.	ERIE PART No.	MALORY PART No.	
C19	3-8			829-10			
C20	3-8			829-10			
C21	800						
C22	3			TCZ-3R3	NPOA-030	ZT-553	
C23	.5-3			829-3	3115-01-0R5	CT565A	
C24	120			DD-121	811-121	UC-5312	
C25	800						
C26	800						
C27	800						
C28	51			DD-500	831-510	UC-545	
C29	.5-3			829-3	3115-01-0R5	CT565A	
C30	10			TCZ-10	NPOA-100	ZT-541	
C31	5						
C32	1500			DD-152	801-0015	DC-5215	
C33	1500			DD-152	801-0015	DC-5215	
C34	6.8			TCZ-6R8	NPOA-6R8	ZT-5568	
C35	800						

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CAPACITORS (cont)

ITEM No.	RATING		REPLACEMENT DATA					NOTES
	CAP.	VOLT.	HOFFMAN PART No.	CENTRALAB PART No.	ERIE PART No.	MALLOY PART No.		
C36	800							
C37	1000		14031	DD-102	801-001	DC-521		
C38	1000		4029	DD-502	801-005	DC-525		
C39	5000		4029	DD-502	811-005	DC-525		
C40	24		14056	TCZ-24	NP0K-240			
C41	1500		4096	DD-152	801-0015	DC-5215		
C42	820			DE-821	811-821			
C43	1500		4096	DD-152	801-0015	DC-5215		
C44	52							
C45	100			DD-101	801-101	UC-531		
C46	1000		14031	DD-102	801-001	DC-521		
C47	1000		14031	DD-102	801-001	DC-521		
C48	880		4042	DD-681	811-681	UC-5368		
C49	1500		4096	DD-152	801-0015	DC-5215		
C50	1000		14031	DD-102	801-001	DC-521		
C51	880		4042	DD-681	811-681	UC-5368		
C52	1000			DD-102	801-001	DC-521		
C53	880		4042	DD-681	811-681	UC-5368		
C54	1000		14031	DD-102	801-001	DC-521		
C55	1000		14031	DD-102	801-001	DC-521		
C56	91			TCZ-91	NP0-327-910			
C57	150			TCZ-150	NP0-354-151	MCE236		
C58	1500		4096	DD-152	801-0015	DC-5215		
C59	3700							
C60	470			DD-471	IR5KV-471	DC30347		
C61	10000		4097	DD-103	811-01	DC-511		
C62	10000		4097	DD-103	811-01	DC-511		
C63	6.8			TCZ-68	NP0A-68	ZT-3568		
C64	10		4027	TCZ-10	NP0A-10			
C65	82			TCZ-82	NP0-337-820			
C66	47		14067	DD-470	831-470	UC-5447		
C67	5000		4029	DD-502	811-005	DC-525		
C68	5000		4029	DD-502	811-005	DC-525		
C69	56		4034	DD-560	831-560	UC-5456		
C70	5000		4029	DD-502	811-005	DC-525		
C71	5000		4029	DD-502	811-005	DC-525		
C72	1000		14031	DD-102	801-001	DC-521		
C73	1000		14031	DD-102	801-001	DC-521		
C74	10000		4097	DD-103	811-01	DC-511		
C75	10000		4097	DD-103	811-01	DC-511		
C76	.5	200	4120	DF-5	PT401			
C77	.1	400	4150	DF-104	PT401			
C78	5000		4029	DD-502	811-005	DC-525		
C79	10000		4097	DD-103	811-01	DC-511		
C80	320		4065	DD-331	811-331	UC-5333		
C81	47		14057					
C82	10000		4097	DD-103	811-01	DC-511	Note 4	
C83A	2000							
C84	5000		#H9695	#PC-100	#4405-01			
C85	4700	500	4035	DF-104	MCE465			
C86	.1	400	4120	DF-5	PT401			
C87	25	400	4117	DF-104	PT4025			
C88	1000	1500	14106	DD30-102	IR5KV-102	DC-3021		
C89	1000		14031	DD-102	801-001	DC-521		
C90	1000		14031	DD-102	801-002	DC-521		
C91	.05	200	4101	DD-502	811-005	DC-525		
C92	3900	500			PT415			
C93	330	500	4010		MCB463			
C94	18							
C95	470	500	14050	TCZ-18	NP0K-180			
C96	10000		4097	DD-103	811-01	DC-511		
C97	.1	600	4150	DF-104	PT601			
C98	140	3000						
C99	140	3000						
C100	.25	600	4139		PT60 25		Note 4	
C101	.25	1000					Note 4	
C102	.047	600	4133	DF-503	PT8147			
C103	1200	15000	14093					
C104	500	10000	4062	TV3-502	413	HY20035A		
C105	1000	15000	14094					
C106	2000	30000	14092					
C107	1000	1500		DD30-102		DC3021	Note 5	
C108	880	1000	4042	DD30-681	IR5KV-681	DC30368		
C109	10000		4097	DD-103	811-01	DC-511		
C110	10000		4097	DD-103	811-01	DC-511		
C111	.25	1000						
C112	.25	1000						
C113	.47	200	4172		PT4047			
C114	360	2500						
C115	360	2500						
C116	150	2500						
C117	.0022	400	4136				Note 4	
C118	140	3000						
C119	.0022	400	4136				Note 4	
C120	140	3000					Note 4	
C121	.0022	400	4136				Note 4	
C122	140	3000						
C123	.22	400	4130					
C124	10	14058		DD-100	831-100	UC-541		
C125	120	4072		TCZ-120	NP0-333-121			
C126	100	14077		DD-101	801-101	MC8235		
C127	10000		4097	DD-103	811-01	DC-511		
C128	10000		4097	DD-103	811-01	DC-511		
C129	10000		4097	DD-103	811-01	DC-511		
C130	10000		4097	DD-103	811-01	DC-511		
C131	5000		4029	DD-502	811-005	DC-525		
C132	5000		4029	DD-502	811-005	DC-525		
C133	5000		4029	DD-502	811-005	DC-525		
C134	22	500					Note 6	
C135	1000		14031	DD-102	801-001	DC-521		
C136	1000		14031	DD-102	801-001	DC-521		
C137	10000		4097	DD-103	811-01	DC-511		
C138	.22	200	4131		PT4022			
C139	2			TCZ-2R4	NP0A-2R2			
C140	5000		4029	DD-502	811-005	DC-525		
C141	10000		4097	DD-103	811-01	DC-511		
C142	220		4094	DD-221	811-221	UC-5322		
C143	82			DD-820	801-820			
C144	5000		4029	DD-502	811-005	DC-525		
C145	1000		14031	DD-102	801-001	DC-521		
C146	.022	400		DF-203	817-02	PT4122		
C147	10000		4097	DD-103	811-01	DC-511		
C148	15	1000		DD-150	811-01	DC-511		
C149	.022	400		DF-203	817-02	PT4122		

PARTS LIST AND DESCRIPTIONS (Continued)  
CAPACITORS (cont)

ITEM No.	RATING		REPLACEMENT DATA					NOTES
	CAP.	VOLT.	HOFFMAN PART No.	CENTRALAB PART No.	ERIE PART No.	MALLOY PART No.		
C150	10000		4097	DD-103	811-01	DC-511		
C151	27	1000						
C152	1.5			TCZ-1R5	NP0A-1R5	ZT-5515	Note 7	
C153	120			DD-121	811-121			
C154	10000		4097	DD-103	811-01	DC-511		
C155	.01	600		DD-103	GP3-333-103	PT811	Note 8	
C156	.01	600		DD-103	GP3-333-103	PT811	Note 8	

Note 4. Not used in some versions.  
 Note 5. Some versions use 10000MMF in this application (part #4097).  
 Note 6. Some versions use 1000MMF in this application (part #14031).  
 Note 7. Some versions may use a 1.5-7MMF variable trimmer in this application.  
 Note 8. Some versions may use .047MFD in this application.  
 \* Items C83A, C83B, C83C, R92A, R92B, R92C are combined in one unit.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	HOFFMAN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLOY PART No.	
R1A	1M		4802A					Volume (Panel)
B	5000							Contrast (Center) Tap at 425Ω
C	20000							Chroma (Rear)
D	Switch							Attach to RIC.
R2A	1000Ω		4812A	AB-5	A47-1000-S	Q11-108	U-4	Blue Horizontal Amplitude
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	UF13L	Attach to R2A.
R3A	1000Ω		4808A	F1-4		Q1-856*		Red Horizontal Amplitude (Panel)
B	1000Ω			R2-4			UR13L	Green Horizontal Amplitude (Rear)
R4A	10KΩ		4831A	AB-14	A47-10K-S	Q11-116	U-20	Chroma Threshold
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	UF55L	Attach to R4A.
R5A	500KΩ		4803A	F1-40		Q1-500†		Blue Difference (Panel)
B	500KΩ			R2-60			UR55L	Green Difference (Rear)
R6A	1000Ω	2	4813A	F7-60		F7-60		Vertical Linearity (Panel)
B	1M			R2-51			UR16L	Wire Wound
R7A	500KΩ		4829A	AB-59	A47-500K-S	Q11-133	U-50	Vertical Height (Rear)
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	UF23L	Master Brightness
R8A	2000Ω		4810A	F1-9		Q1-858†		Attach to R7A.
B	2000Ω			R2-9			UR23L	Red Vertical Amplitude (Panel)
R9A	1000Ω		4809A	F1-4		Q1-817*	UF13L	Green Vertical Amplitude (Rear)
B	2000Ω			R2-9			UR23L	Blue Vertical Tilt (Panel)
R10A	1000Ω		4808A	F1-4		Q1-856*	UF13L	Blue Vertical Amplitude (Rear)
B	1000Ω			R2-4			UR13L	Red Vertical Tilt (Panel)
R11A	1.5M		4822A	AB-742	A47-1.5M-S	Q11-138	U-155	Vertical Hold
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	UF13L	Attach to R11A.
R12A	10KΩ		4820A	AB-14	A47-10K-S	Q11-116	U-20	Horizontal Hold
B	Shaft		Not Req.	AK-1	FKS-1	Not Req.	UF13L	Attach to R12A.
R13A	250KΩ		4824A	AB-50	A47-250K-S	Q11-130	U-46	Blue Screen
B	Shaft		Not Req.	AK-1	FKS-1	Not Req.	UF13L	Attach to R13A.
R14A	250KΩ		4824A	AB-50	A47-250K-S	Q11-130	U-46	Green Screen
B	Shaft		Not Req.	AK-1	FKS-1	Not Req.	UF13L	Attach to R14A.
R15A	500KΩ		4806A	AB-59	A47-500K-S	Q11-133	U-50	Master Screen
B	Shaft		Not Req.	AK-1	FKS-1	Not Req.	UF13L	Attach to R15A.
R16A	100Ω	2	4815A					Horizontal Centering (Panel)
B	100Ω	2						Horizontal Centering (Rear)
R17A	200Ω	2	4814A					Vertical Centering (Panel)
B	200Ω	2						Vertical Centering (Rear)
R18A	5000Ω		4817A	AB-10	A47-5000-S	Q11-114	U-14	Horizontal Drive
B	Shaft		Not Req.	AK-1	FKS-1	Not Req.	UF13L	Attach to R18A.
R19	7.5M		4829A	RTV-354		Q11-133	U-50	High Voltage Adjustment
R20A	500KΩ		4816A	AB-59	A47-500K-S	Q11-133	U-50	Focus
B	Shaft		Not Req.	AK-1	FKS-1	Not Req.	UF13L	Attach to R20A.

\*Concentrik Equivalent; K-6 Kit, Base Elements and Shafts; R11-108, P20-101 (Panel)  
 R11-108, R11-112 (Rear)  
 †Concentrik Equivalent; K-6 Kit, Base Elements and Shafts; R11-108, P20-101 (Panel)  
 R11-110, R11-112 (Rear)  
 ‡Concentrik Equivalent; K-6 Kit, Base Elements and Shafts; R11-133, P20-101 (Panel)  
 R11-133, R11-112 (Rear)  
 ††Concentrik Equivalent; K-6 Kit, Base Elements and Shafts; R11-10, P20-101 (Panel)  
 R11-10, R11-112 (Rear)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	HOFFMAN PART No.	IRC PART No.	
R21	47KΩ			BTS-47K	
R22	15KΩ			BTS-15K	
R23	100KΩ			BTS-100K	
R24	180KΩ			BTS-180K	
R25	270KΩ			BTS-270K	
R26	470Ω			BTS-470	
R27	10KΩ			BTS-	