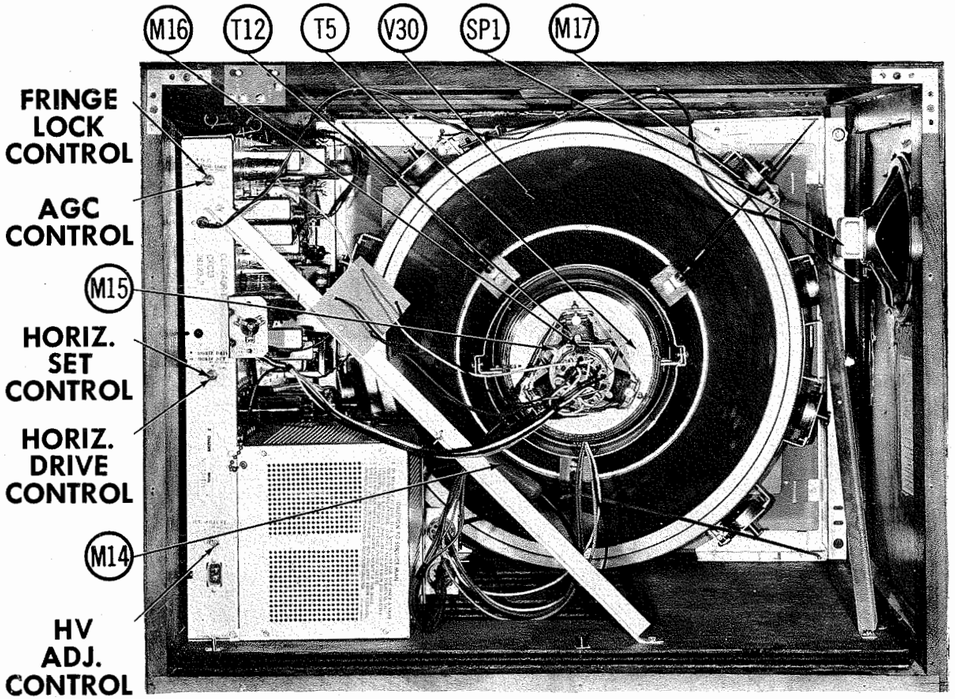


CABINET—REAR VIEW

DISASSEMBLY INSTRUCTIONS

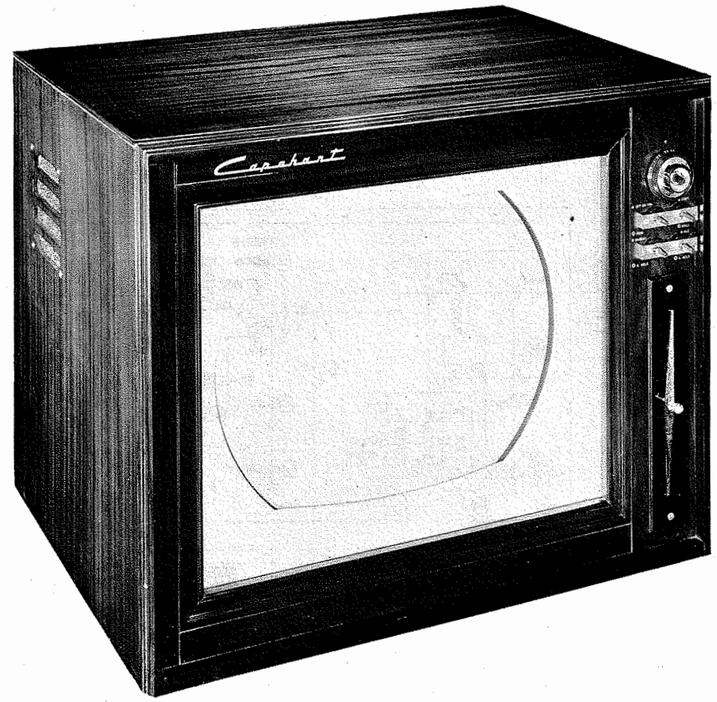
CHASSIS REMOVAL

1. Remove 12 push-on type control knobs from front panel of cabinet.
2. Remove 10 wood screws and 1 metal screw. Remove rear cover.
3. Remove 4 mounting board bolts and 2 picture tube bracket bolts at the inside front of cabinet.
4. Remove speaker leads, remove 4 speaker nuts. Remove speaker.
5. Remove chassis and picture tube assembly from cabinet.

PICTURE TUBE REMOVAL

1. Remove chassis and picture tube assembly from cabinet on mounting board as outlined above.
2. Remove blue beam positioning magnet and purity magnet assembly.
3. Remove ground wire between yoke and convergence coil.
4. Loosen 3 metal screws holding convergence coil and magnet asembly; remove from neck of picture tube.
5. Lay picture tube assembly face down on a soft surface and loosen 3 thumb screws holding retaining ring. Remove retaining ring assembly from picture tube.
6. Remove 1 screw holding equalizing magnets on front of picture tube. Remove from picture tube.
7. Remove insulating shield and remove picture tube from mask.

CAPEHART MODEL 31T216M-5 (Ch. CXC-13)



TRADE NAME	Capehart Model 31T216M-5 (Ch. CXC-13)
MANUFACTURER	Capehart-Farnsworth Co., Fort Wayne, Ind.
TYPE SET	Color Television Receiver
TUBES	Thirty
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING 3.1 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

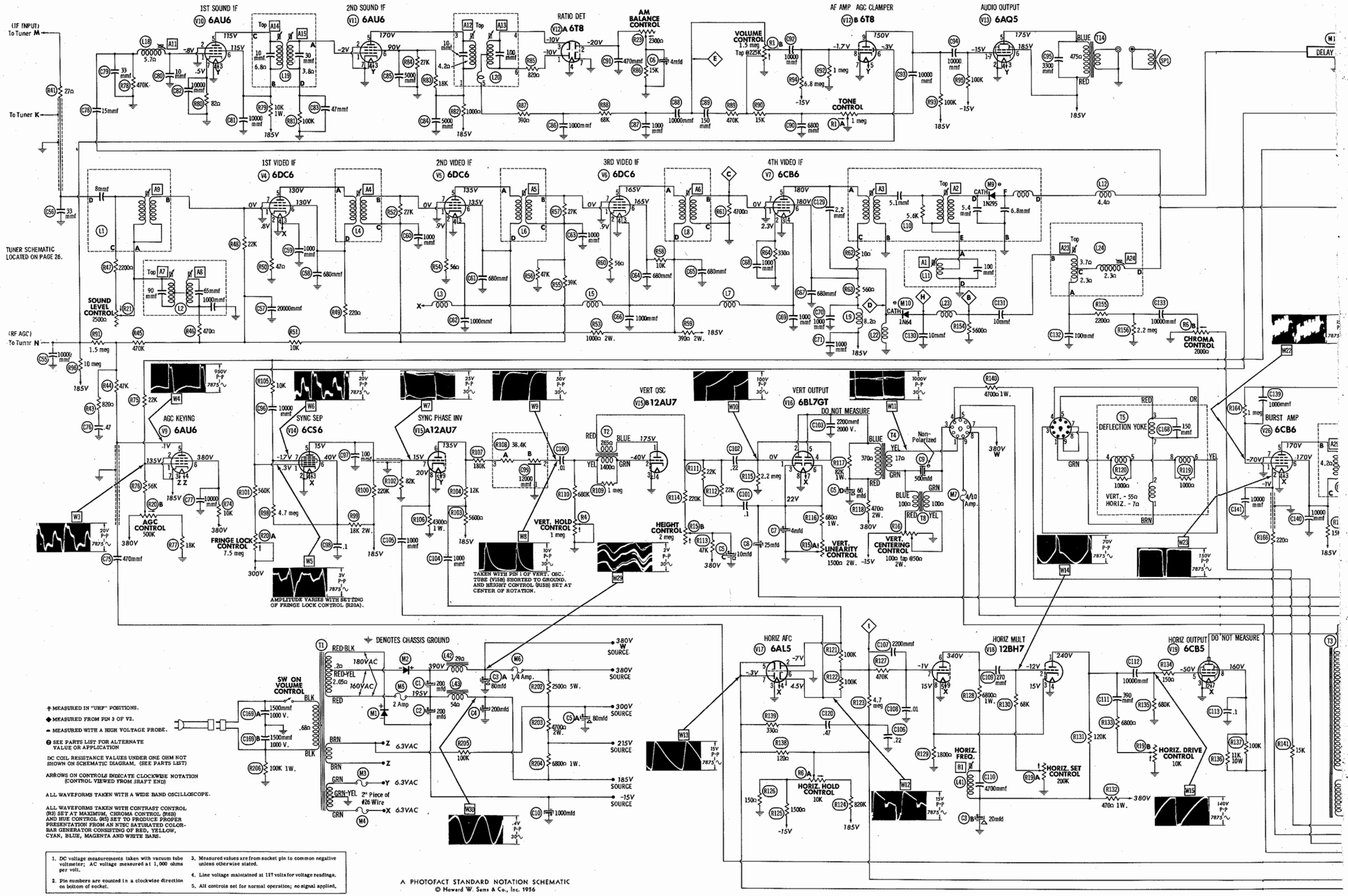
INDEX

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

G482

DATE 8-56 SET 327 FOLDER 3

CAPEHART MODEL 31T216M-5 (Ch. CXC-13)


1ST SOUND IF
V10 6AU6
2ND SOUND IF
V11 6AU6
RATIO DET
V12A 6T8
AM BALANCE CONTROL
VOLUME CONTROL 1.5 meg Tap @25K
AF AMP AGC CLAMPER
V12B 6T8
AUDIO OUTPUT
V13 6AQ5
(IF INPUT) To Tuner M
To Tuner K
DELAY
TONE CONTROL 1 meg
1ST VIDEO IF
V4 6DC6
2ND VIDEO IF
V5 6DC6
3RD VIDEO IF
V6 6DC6
4TH VIDEO IF
V7 6CB6
TUNER SCHEMATIC LOCATED ON PAGE 26.
SOUND LEVEL CONTROL 2500Ω
(RF AGC) To Tuner N
AGC KEYING
V9 6AU6
AGC CONTROL 500K
FRINGE LOCK CONTROL 7.5 meg
SYNC SEP
V14 6CS6
SYNC PHASE INV
V15A 12AU7
VERT OSC
V15B 12AU7
VERT OUTPUT
V16 6BL7GT
DO NOT MEASURE
VERT. HOLD CONTROL 1 meg
HEIGHT CONTROL 2 meg
VERT. LINEARITY CONTROL 1500Ω 2W.
VERT CENTERING CONTROL 100Ω tap @50Ω 2W.
Non-Polarized
4/10 Amp.
DEFLECTION YOKE
VERT. - 55Ω
HORIZ. - 7Ω
BURST AMP
V26 6CB6
CHROMA CONTROL 2000Ω
TAKEN WITH PIN 1 OF VERT. OSC. TUBE (V15B) SHORTED TO GROUND, AND HEIGHT CONTROL (R15B) SET AT CENTER OF ROTATION.
AMPLITUDE VARIES WITH SETTING OF FRINGE LOCK CONTROL (R20A).
DENOTES CHASSIS GROUND
5W ON VOLUME CONTROL
380V W SOURCE
380V SOURCE
300V SOURCE
215V SOURCE
185V SOURCE
-15V SOURCE
HORIZ AFC
V17 6AL5
HORIZ HOLD CONTROL 10K
HORIZ MULT
V18 12BH7
HORIZ. FREQ.
HORIZ. SET CONTROL 200K
HORIZ OUTPUT
V19 6CB5
HORIZ. DRIVE CONTROL 10K
DO NOT MEASURE
◆ MEASURED FROM PIN 3 OF V2.
▬ MEASURED WITH A HIGH VOLTAGE PROBE.
⊖ 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 NOTATION (CONTROL VIEWED FROM SHAFT END)
ALL WAVEFORMS TAKEN WITH A WIDE BAND OSCILLOSCOPE.
ALL WAVEFORMS TAKEN WITH CONTRAST CONTROL (R3) SET AT MAXIMUM, CHROMA CONTROL (R6B) AND HUE CONTROL (R5) SET TO PRODUCE PROPER PRESENTATION FROM AN NTSC SATURATED COLOR-BAR GENERATOR CONSISTING OF RED, YELLOW, CYAN, BLUE, MAGENTA AND WHITE BARS.
1. DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction on 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 PHOTOFACT STANDARD NOTATION SCHEMATIC
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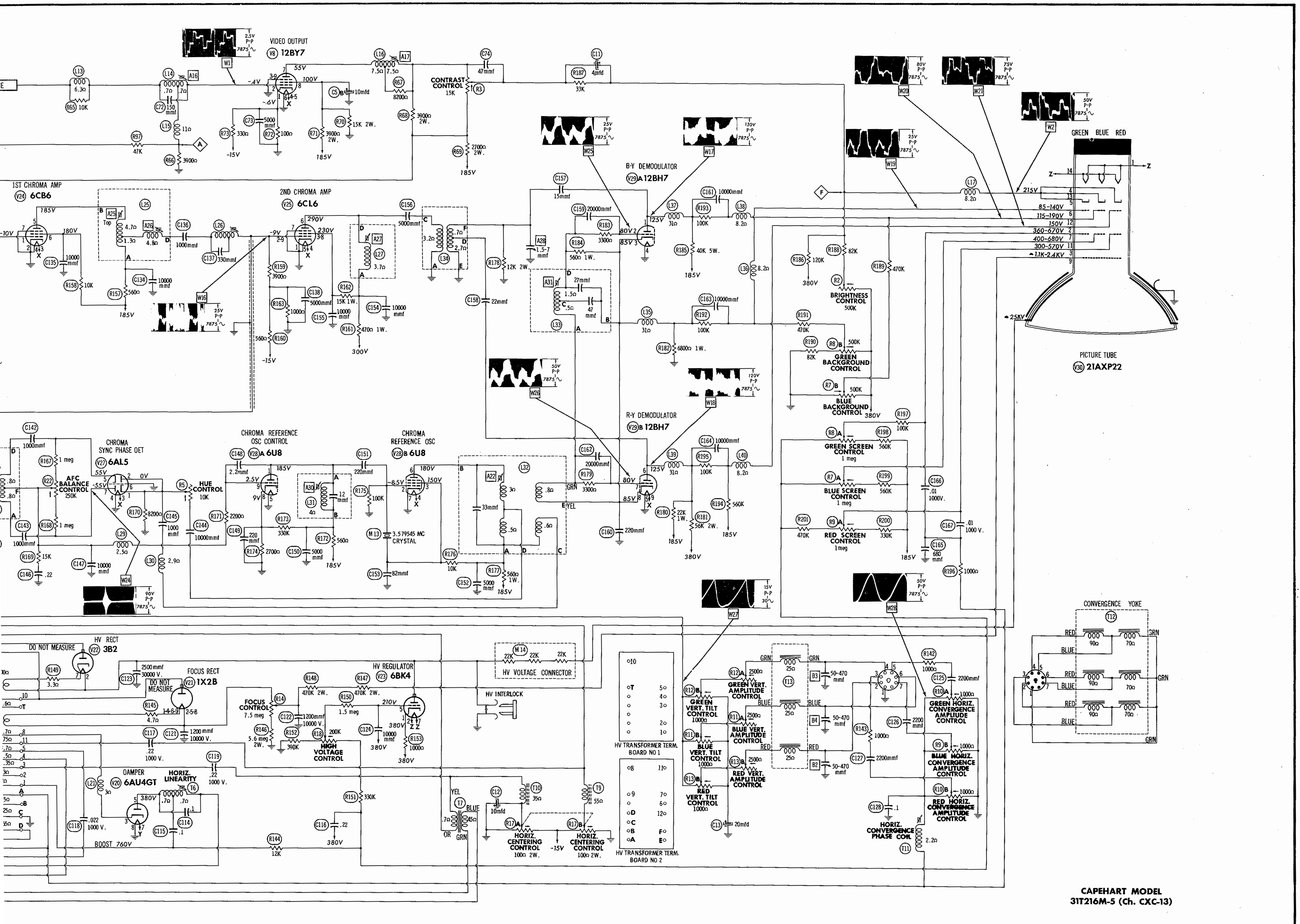
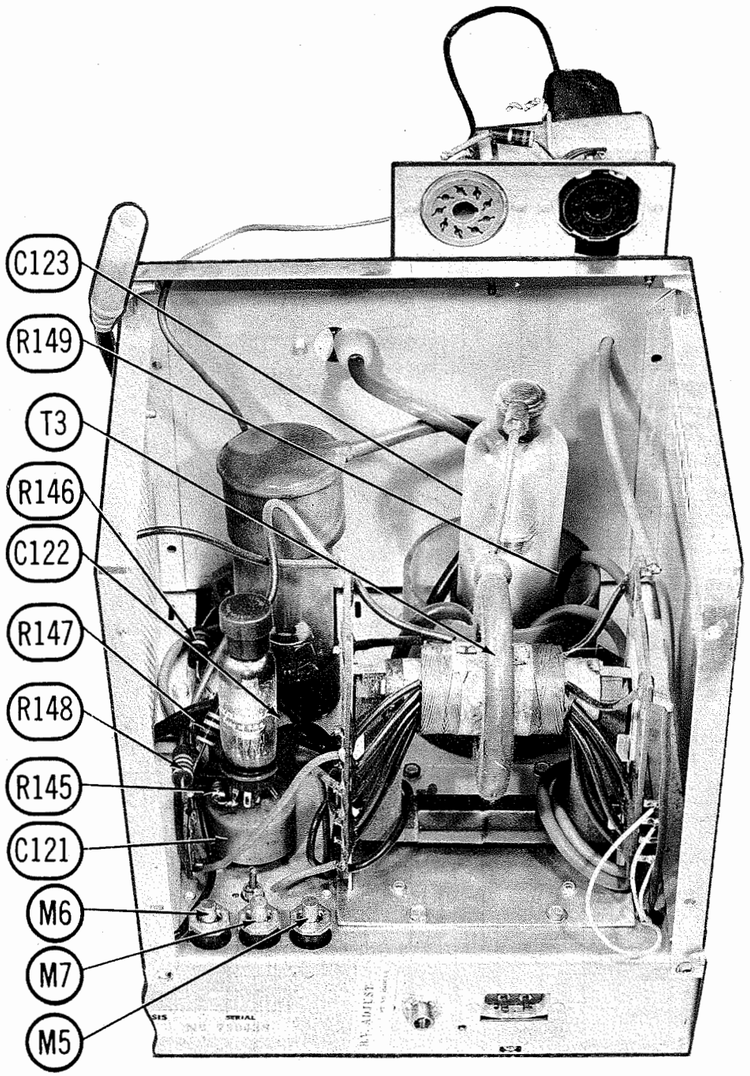
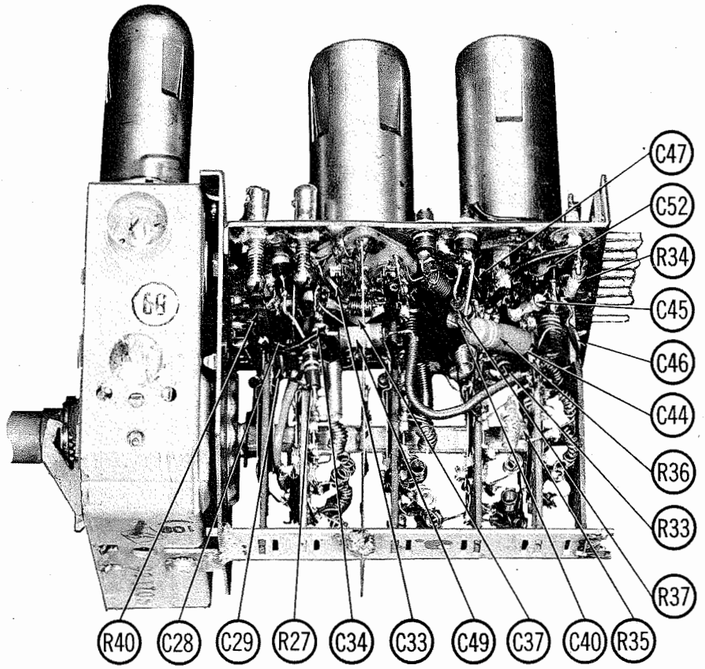
CAPEHART MODEL 31T216M-5 (Ch. CXC-13)

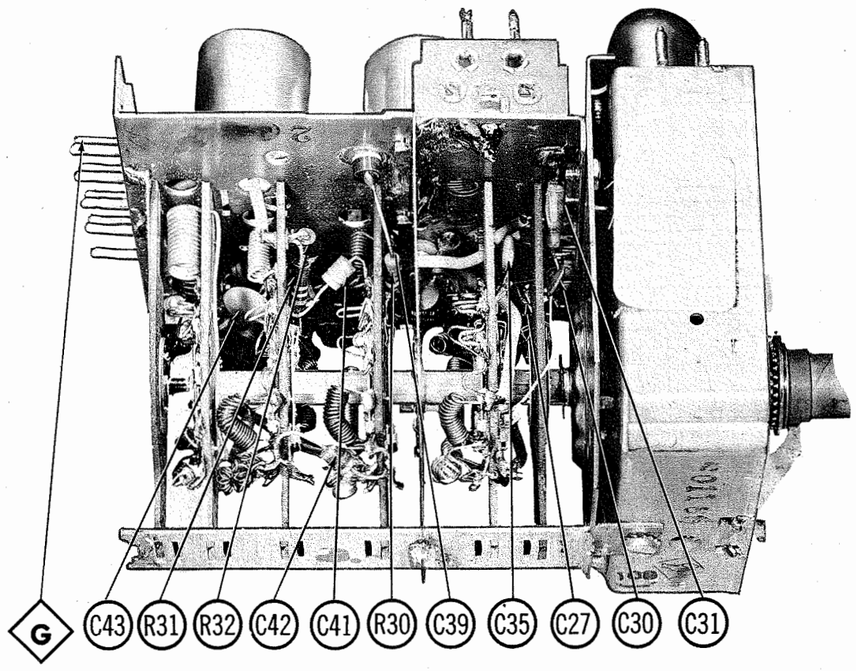




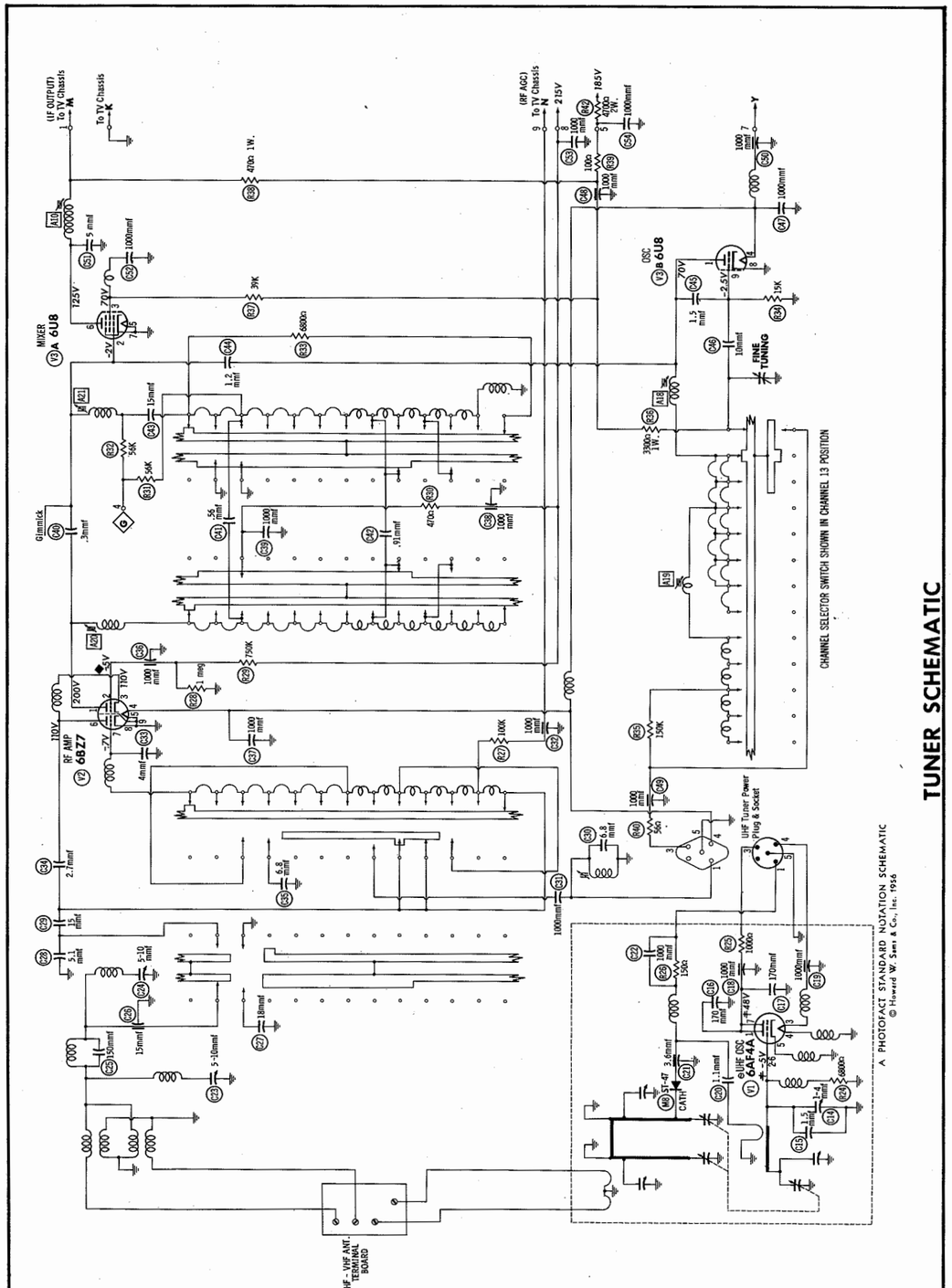
HIGH VOLTAGE COMPARTMENT



RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE



TUNER SCHEMATIC

MISCELLANEOUS ADJUSTMENTS

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Connect a short clip lead from the center arm of the horizontal hold control (R6) to chassis. Connect another clip lead across the horiz. freq. coil (L41). Loosely couple the vertical amplifier lead of the scope to the lead between C75 and pin 5 (plate) of the AGC Keying tube (V9). Do not permit the scope lead to come in direct contact with this wire. Adjust the oscilloscope to obtain two horizontal retrace pulses.

Adjust the horizontal drive control (R19B) until a pip appears on the scope between the two pulses. Readjust the drive control until the pip just disappears.

Connect the DC probe of the VTVM to point (1). Connect the common lead to chassis. Adjust the horizontal set control (R19A) for zero reading on the VTVM.

Remove the short from across the horiz. freq. coil and readjust the drive control following the previously outlined method. Adjust the horiz. freq. coil (B1) for zero volts on the VTVM. Remove the short from the center arm of the horizontal hold control.

HIGH VOLTAGE ADJUSTMENT

Connect a VTVM across R153. (The 1000Ω resistor in the cathode circuit of the H. V. Regulator (V23). Set the brightness and contrast controls fully counter clockwise. Adjust the H. V. Adjustment (R18) to the point where the meter reads .6 volts. If a reliable high voltage meter is available, this setting may be made by adjusting for 25,000 volts on the high voltage anode.

STATIC CONVERGENCE AND PURITY ADJUSTMENTS

1. Turn the set on and tune in a TV station with a monochrome signal. Adjust the set for normal operation.
2. Turn the contrast, red screen, green screen and blue screen controls fully counter clockwise.
3. Turn the brightness control up two thirds from full counter clockwise.
4. Adjust the red, blue and green screens clockwise until a low level white screen is obtained.
5. Connect the RF dot generator across the antenna terminals or if a video dot generator is used, connect it to the output of the video detector.
6. Turn the contrast control clockwise until the dots are just visable.
7. Check the location of the convergence coil assembly to make sure that each coil is directly over its respective pole piece in the picture tube neck. The correct position of the convergence coil assembly will place approximately 3 1/4 inches of neck glass between it and the picture tube base. Make certain that the Blue-Gun Coil is pointed upward.
8. Turn all horizontal and vertical amplitude controls fully counter clockwise and set all horizontal and vertical tilt adjustments to approximately mid-range.
9. Adjust each of the Static Convergence magnets to obtain a misconverged dot pattern in the center of the screen.
10. Adjust the red, blue and green convergence magnets and the blue beam-positioning magnet to superimpose the three dots to form a single white dot at the center of the screen.
11. Disconnect the dot generator.
12. Pull all of the field equalizing magnets on the field equalizing assembly out to their farthest position from the picture tube.
13. Turn the contrast, blue screen, green screen, blue background and green background controls fully counter clockwise.
14. Turn the red screen control fully clockwise.
15. Adjust the purity device, starting with the red tabs together, by rotating each ring magnet with respect to the other and/or the entire assembly to achieve MINIMUM contamination of the red raster. At this point it may be necessary to loosen the deflection yoke and slip it either forward or backward to obtain the most uniform red raster. Readjust the purity device if necessary.
16. Reconnect the dot generator and turn up the blue and green screen controls to obtain a white dot at the center of the screen. It may be necessary to reconverge the dots by adjusting the convergence magnets as in step 10.

    If the purity is not as good as was obtained in step 15 repeat step15.
17. Again turn the blue and green screen controls fully counter clockwise and note any remaining color contamination about the edges of the screen if there is any. These areas may be corrected by adjusting the field equalizing magnets nearest the area contaminated. It may be necessary to make slight readjustment of the purity device as outlined in step 15.
18. Adjust the red, blue and green screen controls to obtain a high level white screen. If any color contamination still remains around the edges of the screen, readjust the individual field equalizing magnets nearest the areas of contamination.
19. Check and readjust the static convergence if necessary.

VERTICAL DYNAMIC CONVERGENCE ADJUSTMENT

With the dot generator still connected check for proper static convergence in the center of the screen.

1. Turn the red vertical amplitude fully clockwise and adjust the red vertical tilt control for maximum displacement of the red dots from the cyan dots at the center of the screen along the vertical row of dots nearest the center of the screen.
2. Turn the green vertical amplitude control fully clockwise and adjust the green vertical tilt control for maximum displacement of the green dots from the red dots in this same vertical line.
3. Turn the blue screen control fully counter clockwise so that only the red and green dots are visable.
4. Adjust the green and red vertical amplitude and tilt control to obtain straight vertical rows of red and green dots equally spaced from each other along the entire vertical line nearest the center of the screen.
5. Converge the two vertical rows of dots nearest the center of the screen using the red and green static convergence magnets to produce a single vertical row of yellow dots. If the dots are displaced near the top or bottom of the vertical row of dots repeat steps 4 and 5 until all the dots in this row appear to be yellow with no indication of fringing of either red or green.
6. Turn up the blue screen control until the blue dots are visable and then set the blue vertical amplitude control fully clockwise.
7. Note the displacement of the blue dots with respect to the yellow dots along this same vertical row, then alternately adjust the blue vertical amplitude and blue vertical tilt controls until the displacement of the blue dots is uniform along the entire vertical row.
8. Converge the vertical row of blue dots with the vertical row of yellow dots by using the blue convergence magnet and if necessary, the blue beam-positioning magnet. This should result in a vertical row of white dots.

HORIZONTAL DYNAMIC CONVERGENCE ADJUSTMENT

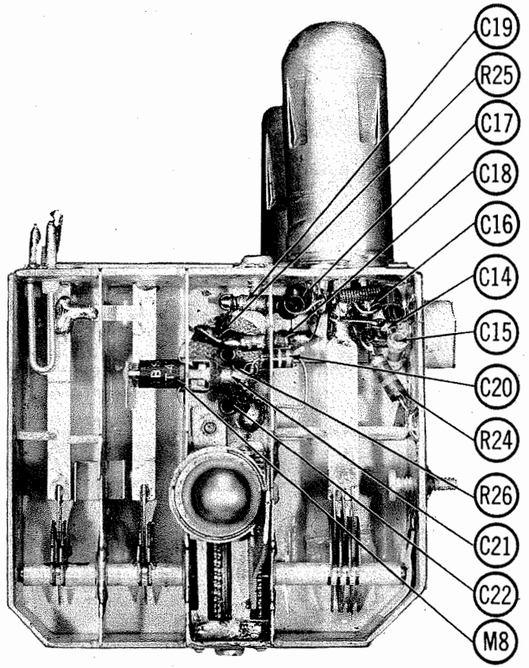
1. Turn the red horizontal amplitude control fully clockwise and adjust the red horizontal tilt trimmer B2 for maximum displacement of the red dots from the cyan dots along the horizontal row of dots nearest the center of the screen.
2. Turn the green horizontal amplitude control fully clockwise and adjust the green horizontal tilt trimmer B3 for maximum displacement of the green dots from the red dots along this same horizontal line.
3. Turn the blue screen control fully counter clockwise so that only the red and green dots are visable.
4. Adjust the red and green horizontal amplitude and tilt B2, B3 to obtain straight horizontal rows of red and green dots equally spaced from each other along the entire horizontal line nearest the center of the screen.
5. Converge the two horizontal rows of dots nearest the center of the screen using the red and green static convergence magnets to produce a single horizontal row of yellow dots. If the dots are displaced near the right or left hand side of the screen repeat steps 4 and 5 until all the dots in this row appear to be yellow with no indication of fringing of red or green.
6. Turn up the blue screen until the blue dots are visable and then set the blue horizontal amplitude control fully clockwise.
7. Note the displacement of the blue dots with respect to the yellow dots along this same horizontal row, then alternately adjust the blue horizontal amplitude and the blue horizontal tilt trimmer B4 until the displacement of the blue dots is uniform along the entire horizontal row.
8. Converge the horizontal row of blue dots with the horizontal row of yellow dots by using the blue convergence magnet and if necessary, the blue beam-positioning magnet. If these adjustments have been properly made, the entire screen area should now show optimum convergence of the dot pattern.

GRAY SCALE ADJUSTMENT
WHITE ADJUSTMENT

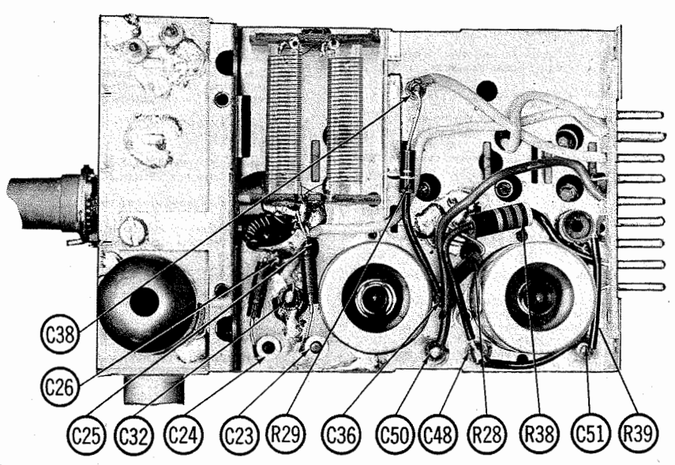
1. Remove the dot generator and connect the antenna to the antenna terminals. Tune in a TV station with a monochrome signal.
2. Turn the contrast and chroma controls fully counter clockwise.
3. Set the brightness control for normal brightness level and set the blue and green background controls to approximately mid-range.
4. Adjust the blue and green screen controls to produce a low brightness white raster. The color of the white should appear about the same as a low brightness setting on a standard black and white picture tube.

HIGH-LIGHT AND LOW-LIGHT ADJUSTMENT

1. Set the contrast to mid-position.
2. Observe the high-light areas of the picture and again adjust the red, blue, green screen controls for a white raster.
3. Turn the brightness control down and note the low-light areas of the picture and if one or more colors predominate adjust the proper screen control to reduce that color. Adjust the blue and green background controls to again produce a low brightness white screen.
4. Repeat these adjustments until proper tracking is obtained between low-light and high-light areas as the contrast control is varied.



UHF TUNER FRONT VIEW



RF TUNER TOP VIEW

PARTS LIST AND DESCRIPTIONS (Continued)

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			CAPEHART PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M3		2" Piece #24 Wire						
M4		2" Piece #24 Wire						
M5	N	2A 125V			333002.(N2A)	346017	N2	HN 1 3/4-2 1/2
M6	N	1/4A 125V			333.250 (N 1/4A)	346008	N 1/4	HN 0-3/10
M7	N	4/10A 250V			333.400 (N 4/10A)	346009	N 4/10	HN 3/10-1/2

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		CAPEHART PART No.	SYLVANIA PART No.	
M8	ST-47		1N82 or 1N82A	UHF Mixer (Clip in)
M9	1N295 *		1N60	Luminance Det. (Pigtail)
M10	1N64 †		1N60	Sound & Chrominance Det. (Pigtail)

* Some versions may use crystal diode type 1N60 in this application.
† Some versions may use crystal diode types 1N60 or 1N295 in this application.

MISCELLANEOUS

ITEM No.	PART NAME	CAPEHART PART No.	NOTES
M11	Tuner	750863A-1	VHF-UHF Combination
M12	Delay Line	651151A-2	Luminance Channel
M13	Crystal	750746A	3579.545KC Osc.
M14	High Voltage Connector		Consists of polystyrene connector & lead with three 22KΩ high voltage filter resistors.
M15	Magnet		Purity
M16	Magnet	651143A	Blue beam lateral corrector
M17	Magnet Assy.		Picture tube rim purity
	Trimmer Cap.	453457A-2	Demodulator driver trans. trimmer (1.5-7MMF)
	Trimmer Cap.		Blue horizontal tilt (50-470MMF)
	Trimmer Cap.	651148A-1	Green horizontal tilt (50-470MMF)
	Trimmer Cap.		Red horizontal tilt (50-470MMF)

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: CAPEHART PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L6	3rd Video IF	.1Ω	.1Ω	750736A-1				
L7	Fil. Choke	0Ω						.6 Microhenries
L8	4th Video IF	.1Ω	.1Ω	750736A-1				
L9	RF Choke	8.2Ω			19-1005		4612	10 Microhenries, IRC Part No. CL-1
L10	Luminance Detector	.2Ω		750738A-1				Includes 5th Video IF, Caps., Resistor, Series Peaking Coil, and Luminance Det. Crystal M9 Tapped
L11	41.25MC Trap			7507737A-1				
L12	Series Peaking Coil	4.4Ω			19-3100	TV-181	6177	100 Microhenries
L13	Series Peaking Coil	6.3Ω			19-3180	TV-184	6180	180 Microhenries
L14	3.58MC Trap	1.4ΩCT						
L15	Shunt Peaking Coil	11Ω			19-3500		6138	450 Microhenries
L16	Series Peaking Coil	16Ω		750755A-1				Tapped @ 7.5Ω
L17	Series Peaking Coil	8.2Ω			19-1005		4612	10 Microhenries, IRC Part No. CL-1
L18	1st Sound IF	5.7Ω					1470	
L19	2nd Sound IF	6.8Ω	3.8Ω	750733B-1				
L20	Ratio Det.	4.2Ω	.6ΩCT	750740A-1	17-1033	TV-110	1466	Tertiary Winding=.5Ω
L21	RF Choke	3Ω						3.3 Microhenries; IRC Part No. CLA
L22	RF Choke	.9Ω						12 Microhenries
L23	Series Peaking Coil	.9Ω						12 Microhenries
L24	Chroma Bandpass Trans.	6Ω		750766A-1				Tapped @ 2.3Ω Tertiary Winding=2.3Ω
L25	Chroma Interstage Trans.	6Ω		750766A-2				Tapped @ 1.3Ω-Tertiary Winding=4.8Ω
L26	4.5MC Trap	.5Ω						
L27	2nd Chroma Amp. Plate Coil	3.7Ω		750751B-1				
L28	Burst Amp. Trans.	4.2Ω	1.7ΩCT	750806A-1				
L29	Series Peaking Coil	2.5Ω			19-3036	TV-180	6176	39 Microhenries
L30	Series Peaking Coil	2.9Ω			19-7047		4517	50 Microhenries
L31	Chroma Reference Osc. Coil	4Ω		750750B-1				
L32	Chroma Reference Osc.Plate Coil	3Ω	.6Ω	750749B-1				Tertiary Winding #1=.6Ω Tertiary Winding #2=.8Ω
L33	Phase Shift Coil	2Ω		750747B-1				Tapped @ .5Ω
L34	Demodulator Driver Trans.	3.2Ω	3.4Ω	750754C-1				Tapped @ 2.7Ω
L35	Series Peaking Coil	31Ω			19-4950		4652	1 Millihenry
L36	Series Peaking Coil	8.2Ω			19-1005		4612	10 Microhenries, IRC Part No. CL-1
L37	Series Peaking Coil	31Ω			19-4950		4652	1 Millihenry
L38	Series Peaking Coil	8.2Ω			19-1005		4612	10 Microhenries, IRC Part No. CL-1
L39	Series Peaking Coil	31Ω			19-4950		4652	1 Millihenry
L40	Series Peaking Coil	8.2Ω			19-1005		4612	10 Microhenries, IRC Part No. CL-1

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: CAPEHART PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Rom PART No.	Thordarson PART No.	NOTES
L41	58Ω		650637B-1	19-1576	TV-163	6210			HS-5	

FILTER CHOKE

ITEM No.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D.C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA: CAPEHART PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L42	.310A	29Ω	1HY	650587C-5	C5037 ①	C2996 ①	C2326 ①	26C44	C-17X ①
L43	.150A	54Ω	1.2HY	650215A-5	C5040	C2994	C2327	26C43 ①	C-21X ①

① Drill one new mounting hole.

SELENIUM RECTIFIER

ITEM No.	RATING: CURRENT	REPLACEMENT DATA: CAPEHART PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	NOTES
M1	.460A	1107325-3	1319A	9RS500SL	98750		609	
M2	.310A	1371A			98750		509	

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	UHF Oscillator	6AF4A	Note 1
V2	RF Amplifier	6BZ7	
V3	Mixer-Oscillator	6U8	
V4	1st. Video IF Amplifier	6DC6	
V5	2nd. Video IF Amplifier	6DC6	
V6	3rd. Video IF Amplifier	6DC6	
V7	4th. Video IF Amplifier	6CB6	
V8	Video Output	12BY7	
V9	AGC Keying	6AU6	
V10	1st. Sound IF Amplifier	6AU6	
V11	2nd. Sound IF Amplifier	6AU6	
V12	Ratio Detector-AF Amplifier-AGC Clamper	6T8	
V13	Audio Output	6AQ5	
V14	Sync Separator	6CS6	
V15	Vert. Osc.-Sync Phase Inv.	12AU7	
V16	Vert. Output	6BL7GT	
V17	Horiz. AFC	6AL5	
V18	Horiz. Mult.	12BH7	
V19	Horiz. Output	6CB5	
V20	Damper	6AU4GTA	Note 2
V21	Focus Rectifier	1X2B	
V22	HV Rectifier	3B2	
V23	HV Regulator	6BK4	
V24	1st. Chroma Amplifier	6CB6	
V25	2nd. Chroma Amplifier	6CL6	
V26	Burst Amplifier	6CB6	
V27	Chroma Sync Phase Det.	6AL5	
V28	Chroma Ref. Osc. Cont.-Chroma Ref. Osc.	6U8	
V29	R-Y Demodulator-B-Y Demodulator	12BH7	

Note 1. 6T4 may be used in some versions.
Note 2. 6BL4 may be used in some versions.

PICTURE TUBE

ITEM No.	REPLACEMENT DATA: CAPEHART PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	NOTES
V30	21AXP22			21AXP22	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: CAPEHART PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	200	250		AFHS1-31-80		FP126	TM-200-250	S-160 / MT-2540	R2067 *
C2	200	250		AFHS1-31-80		FP126	TM-200-250	S-160 / MT-2540	R2067 *
C3A	▲80	475		AFH2-101-75	C036	FP262	TMD-93	S-305	R2241 *
B	▲20	400				TC75		MT-4520	
C4	200	250							
C5A	▲60	350		AFH4-104-50		FP377.4	TMQ-122	Q-055	R2242 *
B	10	250				TC80	TD-50-450	MT-4580	
C	■10	400							
D	▲60	400							
C6	4	150		PRS150V4	BR415	TC40	TD-4-150	FM-1504	TVA-1402
C7	4	50		PRS150V4	BR550	TC30	TD-4-50	MMT-0505	TVA-1303
C8	25	50		PRS50V25	BR255	TC36	TD-25-50	FM-0525	TVA-1306
C9	500	10	(Note 1)	PRS10VNP500	BRH1510 ‡ / BRH1510 ‡	TC412		D-015 †	
C10	1000	15		PRS15V1000	BRH1510	TC1501	TD-1000-15	S-020	TVA-1163
C11	4	150		PRS150V4	BR415	TC40	TD-4-150	FM-1504	TVA-1402
C12	10	25		PRS25V10	BR102	TC22	TD-10-25	FM-0210	TVA-1204
C13	20	25		SRE25V20	BR202	TC26	TD-25-25	FM-0225	TVA-1205

Note 1. Non-polarized unit.
* Unit must be ordered from Mfgr.
† Use positive terminals only. Insulate case.
‡ Connect negative leads together.

FIXED CAPACITORS

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

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: CAPEHART PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C14	1-4									
C15	1.5									
C16	170									
C17	170									
C18	1000									
C19	1000									
C20	1.1									
C21	3.6									
C22	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C23	5-10									
C24	5-10									
C25	150									
C26	15									
C27	18									
C28	5.1									
C29	15									
C30	6.8			NP0-DI6.8	TCZ-6R8	Z013	NP0A-6R8	ZT-5568	5TCCB-V68	
C31	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C32	1000									
C33	4									
C34	2.7									
C35	6.8			NP0-DI6.8	TCZ-6R8	Z013	NP0A-6R8	ZT-5568	5TCCB-V68	
C36	1000									
C37	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C38	1000									
C39	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C40	.3									
C41	.56									
C42	.91									
C43	15			NP0-DI15	TCZ-15	Z021	NP0K-150		5TCC-T15	
C44	1.2									
C45	1.5									
C46	10									
C47	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C48	1000									
C49	1000									
C50	1000									
C51	5									
C52	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C53	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C54	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C55	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-81	

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA CAPEHART PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C56	33			NP0A-DI33	TCZ-33	Z029	NP0L-330	ZT-5433	5TCC-Q33	
C57	20000			BPD-02	DD-203	K085	817-02		5HK-S2	
C58	680			DI680	DD-681	K065	811-681	UC-5368	5GA-T68	
C59	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C60	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C61	680			DI680	DD-661	K065	811-681	UC-5368	5GA-T68	
C62	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C63	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C64	680			DI680	DD-681	K065	811-681	UC-5368	5GA-T68	
C65	680			DI680	DD-681	K065	811-681	UC-5368	5GA-T68	
C66	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C67	680			DI680	DD-681	K065	611-681	UC-5368	5GA-T68	
C66	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C69	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C70	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C71	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C72	150			1469-00015	TCZ-150	22R5T15	NP0-334-151	ZT-5315	5TCC-T15	
C73	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C74	47			N330-SI47	TCA-47	G056	N330L-470			
C75	470			BPD-00047	DD-471	K060	811-471	UC-5347	5GA-T47	
C76	.47	400		P488N-47		CUB4P47		PT4047	4TM-P47	
C77	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C78	15			NP0-DI15	DD-150	Z021	831-150	UC-5215	5TCC-Q15	
C79	33			NP0-DI33	TCZ-33	Z029	NP0L-330	ZT-5433	5TCC-T33	
C80	10				TCA-10		N330A-100			
C81	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C82	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C83	47			N330-SI47	TCA-47		N330L-470			
C84	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C85	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C86	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C87	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C88	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C89	150			N750-DI150	TCN-150	N046	N750-337-151		5TCU-Q15	
C90	6800			BPD-0068	DD-681	K081	811-0068		5HK-D68	
C91	470			BPD-00047	DD-471	K060	811-471	UC-5347	5GA-T47	
C92	10000			BPD-01	DD-103	K082	811-01	DC-521	5HK-S1	
C93	10000			BPD-01	DD-103	K082	811-01	DC-521	5HK-S1	
C94	10000			BPD-01	DD-103	K082	811-01	DC-521	5HK-S1	
C95	3300			BPD-0033	D6-332	K077	811-0033	UC-5233	5HK-D33	
C96	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C97	100			N750-DI100	TCN-100	TN22	N750L-101	NT-531	5TCU-T1	
C98	.1	200		P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C99	12000		†453214A-1	†PA-501	†PC-104				†103C12	
C100	.01	600		BPD-01	DD-103	CUB6S1	GP3-333-103	PT611	6TM-P1	
C101	.1	400		P486N-1	DF-104	CUB4P1		PT411	4TM-P1	
C102	.22	400		P488N-22		CUB4P22		PT4022	4TM-P22	
C103	2200	2000		HVD-30-2200	DD30-222	VD22	1R5KV-222	DC30222		
C104	1000			DI001	DD-102	K069	801-001	DC-521	5GA-D1	
C105	1000			DI001	DD-102	K069	801-001	DC-521	5GA-D1	
C106	.22	200		P288N-22		CUB2P22		PT4022	2TM-P22	
C107	2200			DI0022	D6-222	K073	811-0022	UC-5222	5HK-D22	
C108	.01	400		BPD-01	DD-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C109	270	500		NP0-SI270	D6-271	22R5T27	NP0-335-271		MS-327	
C110	4700	500		1464-0047		1R5D47			MS-247	
C111	390	500			D6-391	5R5T39	811-391		MS-339	
C112	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C113	.1	400		P488N-1	DF-104	CUB4P1		PT411	4TM-P1	
C114	.1	600		P688N-1	DF-104	CUB6P1		PT601	6TM-P1	
C115	.1	600		P688N-1	DF-104	CUB6P1		PT601	6TM-P1	
C116	.22	600		P688N-22		CUB6P22		PT6022	6TM-P22	
C117	.22	1000								
C118	.022	1000		P1088N-022		CUB16S22		PT16122	10TM-S22	
C119	.22	1000								
C120	.47	200		P288N-47		CUB2P47		PT4027	2TM-P47	
C121	1200	10000								
C122	1200	10000								
C123	2500	30000								
C124	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C125	2200			BPD-0022	D6-222	K073	811-0022	UC-5222	5HK-D22	
C126	2200			BPD-0022	D6-222	K073	811-0022	UC-5222	5HK-D22	
C127	2200			BPD-0022	D6-222	K073	811-0022	UC-5222	5HK-D22	
C128	.1	200		P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C129	2.2			NP0-SI2.2	TCZ-2R2	TZ05	NP0A-2R2		5TCCB-V22	
C130	10			NP0-SI10	TCZ-10	TZ09	NP0A-100	ZT-541	5TCC-Q1	
C131	10			NP0-SI10	TCZ-10	TZ09	NP0A-100	ZT-541	5TCC-Q1	
C132	100			N750-DI10	TCN-100	TN22	N750L-101	NT-531	5TCU-T1	
C133	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C134	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C135	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C136	1000			DI001	DD-102	K069	801-001	DC-521	5HK-D1	
C137	330			1469-00033	D6-331	5R5T33			MS-333	
C138	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C139	1000			DI001	DD-102	K069	801-001	DC-521	5HK-D1	
C140	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C141	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C142	1000			DI001	DD-102	K069	801-001	DC-521	5HK-D1	
C143	1000			DI001	DD-102	K069	801-001	DC-521	5HK-D1	
C144	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C145	1000			DI001	DD-102	K069	801-001	DC-521	5HK-D1	
C146	.22	200		P288N-22		CUB2P22		PT4022	2TM-P22	
C147	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C148	2.2			NP0-SI2.2	TCZ-2R2	TZ05	NP0A-2R2		5TCCB-V22	
C149	220			N750-DI220	TCN-220	TN30	N750-337-221		5TCU-T22	
C150	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C151	220			BPD-00022	TCN-220	TN30	N750-337-221		5TCU-T22	
C152	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C153	82			DI000082	TCN-82	TN20	N750L-820			
C154	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C155	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C156	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C157	15				TCA-15		N330K-150			
C158	22			NP0-DI22	TCZ-22	Z024	NP0K-220		5TCC-Q22	
C159	20000			BPD-02	DD-203	K085	817-02		5HK-S2	
C160	220			N750-DI220	TCN-220	TN30	N750-337-221		5TCU-T22	
C161	10000			BPD-01	DD-103	K080	811-01	DC-511	5HK-S1	
C162	20000			BPD-02	DD-203	K085	817-02		5HK-S2	
C163	10000			BPD-01	DD-103	K080	811-01	DC-511	5HK-S1	
C164	10000			BPD-01	DD-103	K080	811-01	DC-511	5HK-S1	
C165	680			BPD-00068	DD-681	K065	811-681	UC-5368	5GA-T68	
C166	.01	1000		P1088N-01	DD-103	CUB16S1		PT16S1	10TM-S1	
C167	.01	1000		P1088N-01	DD-103	CUB16S1		PT16S1	10TM-S1	
C168	150			HVD-30-150	DD30-151	V3T15	6KV-151		30GA-T15	
C169A	1500	1000		HVD-15-1500	DD-152	VD15	1R5KV-152	DC30215	10GA-D15	
B	1500	1000		HVD-15-1500	DD-152	VD15	1R5KV-152	DC30215	10GA-D15	

† Items C99, R108A and R108B are combined in one unit.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA CAPEHART PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg		850366A-10	F1-51	RTV-586		UF16L	Tone (Panel)
B	1.5Meg			R2-66			UR26-T25	Volume tapped at 225K (Rear)
C	Switch			KB-1			US-26	Attach to R1B.
R2	500KΩ		850341A-19					Brightness
R3A	15KΩ		850341A-25		A47-15K-S			Contrast
B	Shaft		Not Req.		RS-3/16			Attach to R3A.
R4	1Meg		850341A-20					Vert. Hold
R5A	10KΩ		850341A-18	AB-15	A47-10K-Z	Q13-116	U16	Hue
B	Shaft		Not Req.	AK-8	RS-3/16	NQ	DS-37	Attach to R5A.
R6A	10KΩ		850366A-11	F1-23		* QJ-1017	UF14L	Horiz. Hold (Panel)
B	2000Ω			R2-9			UR23L	Chroma (Rear)
R7A	1Meg		850366A-16	F1-51		**QJ-1016	UF16L	Blue Screen (Panel)
B	500KΩ			R2-40			UR55L	Blue Background (Rear)
R8A	1Meg		850366A-16	F1-51		**QJ-1016	UF16L	Green Screen (Panel)
B	500KΩ			R2-40			UR55L	Green Background (Rear)
R9A	1Meg		850366A-15	F1-51		† QJ-1015	UF16L	Red Screen (Panel)
B	1000Ω			R2-4			UR13L	Red Horiz. Conv. Amplitude (Rear)
R10A	1000Ω		850366A-7	F1-4		†† QJ-1014	UF13L	Green Horiz. Conv. Amplitude (Panel)
B	1000Ω			R2-4			UR13L	Blue Horiz. Conv. Amplitude (Rear)
R11A	2500Ω		850366A-6	F1-12		♦ QJ-1013	UF252L	Blue Vert. Amplitude (Panel)
B	1000Ω			R2-4			UR13L	Blue Vert. Tilt (Rear)
R12A	2500Ω		850366A-6	F1-12		♦ QJ-1013	UF252L	Green Vert. Amplitude (Panel)
B	1000Ω			R2-4			UR13L	Green Vert. Tilt (Rear)
R13A	2500Ω		850366A-6	F1-12		♦ QJ-1013	UF252L	Red Vert. Amplitude (Panel)
B	1000Ω			R2-4			UR13L	Red Vert. Tilt (Rear)
R14	7.5Meg		750728A-1					Focus
R15A	1500Ω	2	850366A-5	F7-72			WF152	Vert. Lin. Wire-Wound (Panel)
B	2Meg			R2-67			UR26L	Height (Rear)
R16	100Ω	2	850341A-22			WPS100X50		Vert. Centering tapped at 50Ω Wire-Wound
R17A	100Ω	2	850366A-8					Horiz. Centering
B	100Ω	2						Wire-Wound
R18A	200KΩ		850341A-17	AB-46	A47-200K-S	Q11-129	† U43	High Voltage
B	Shaft		Not Req.	AK-1	FKS-1/4	RQ	Not Req.	Attach to R18A.
R19A	200KΩ		850366A-9	F1-33		♦♦QJ-1011	UF254L	Horiz. Set (Panel)
B	10KΩ			R2-23			UR14L	Horiz. Drive (Rear)
R20A	7.5Meg		850366A-13	F1-83		■ QJ-1010	UF106L	Fringe Lock(Panel)
B	500KΩ			R2-40			UR55L	AGC (Rear)
R21	2500Ω		850341A-24					Sound Level
R22	250KΩ		651150A-3					AFC Balance
R23	2300Ω		651150A-1					AM Balance

• Concentrikit Equivalent, K-4 Kit, Base Elements and Shafts; Bll-116 & P6-218 (Panel) Bll-110 & Rl-316 (Rear)

•• Concentrikit Equivalent, K-15 Kit, Base Elements and Shafts; Bll-137 & P19-016 (Panel) Bll-133 & R15-009 (Rear)

† Concentrikit Equivalent, K-15 Kit, Base Elements and Shafts; Bll-137 & P19-016 (Panel) Bll-108 & R15-009 (Rear)

†† Concentrikit Equivalent, K-15 Kit, Base Elements and Shafts; Bll-108 & P19-016 (Panel) Bll-108 & R15-009 (Rear)

♦ Concentrikit Equivalent, K-15 Kit, Base Elements and Shafts; Bll-111 & P19-016 (Panel) Bll-108 & R15-009 (Rear)

♦♦ Concentrikit Equivalent, K-15 Kit, Base Elements and Shafts; Bll-129 & P19-016 (Panel) Bll-116 & R15-009 (Rear)

■ Concentrikit Equivalent, K-15 Kit, Base Elements and Shafts; Bll-142 & P19-016 (Panel) Bll-133 & R15-009 (Rear)

‡ Saw slot in shaft.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA CAPEHART PART No.	IRC PART No.	NOTES
R24	6800Ω			BTS-1000	
R25	1000Ω			BTS-150	
R26	150Ω			BTS-100K	
R27	100KΩ			BTS-1Meg 5%	
R28	1Meg 5%			BTS-750K 5%	
R29	750KΩ 5%			BTS-470	
R30	470Ω				
R31	56KΩ				
R32	56KΩ				
R33	6800Ω				
R34	15KΩ			BTS-15K	
R35	150KΩ			BTS-150K	
R36	3300Ω	1		BTA-3300	
R37	39KΩ			BTS-39K	
R38	470Ω	1		BTA-470	
R39	100Ω			BTS-100	
R40	56Ω			BTS-56	
R41	27Ω 5%			BTS-27 5%	
R42	4700Ω	2		BTB-4700	
R43	820Ω			BTS-820	
R44	47KΩ			BTS-47K	
R45	470KΩ			BTS-470K	
R46	470Ω			BTS-470	
R47	2200Ω			BTS-2200	
R48	22KΩ 5%				
R49	220Ω			BTS-220	
R50	47Ω 5%			BTS-47 5%	
R51	10KΩ			BTS-10K	
R52	27KΩ 5%				
R53	1000Ω	2		BTB-1000	
R54	56Ω 5%			BTS-56 5%	
R55	39KΩ			BTS-39K	
R56	47KΩ			BTS-47K	
R57	27KΩ 5%				
R58	10KΩ			BTS-10K	
R59	390Ω	2		BTB-390	
R60	56Ω 5%			BTS-56 5%	
R61	4700Ω 5%				
R62	10Ω			BTS-10	
R63	560Ω			BTS-560	
R64	330Ω			BTS-330	
R65	10KΩ			BTS-10K	
R66	3900Ω 5%			BTS-3900 5%	
R67	8200Ω			BTS-8200	
R68	3900Ω	2		BTB-3900	
R69	2700Ω	2		BTB-2700	
R70	15KΩ	2		BTB-15K	
R71	3900Ω	2		BTB-3900	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA CAPEHART PART No.	IRC PART No.	NOTES
R72	100Ω			BTS-100	
R73	330Ω			BTS-330	
R74	10KΩ			BTS-10K	
R75	22KΩ			BTS-22K	
R76	56KΩ			BTS-56K	
R77	18KΩ			BTS-18K	
R78	470KΩ			BTS-470K	
R79	10KΩ	1		BTA-10K	
R80	82Ω			BTS-82	
R81	100KΩ			BTS-100K	
R82	1000Ω			BTS-1000	
R83	18KΩ			BTS-18K	
R84	27KΩ			BTS-27K	
R85	820Ω			BTS-820	
R88	15KΩ			BTS-15K	
R87	390Ω			BTS-390	
R88	68KΩ			BTS-68K	
R89	470KΩ			BTS-470K	
R90	15KΩ			BTS-15K	
R91	1.5Meg			BTS-1.5Meg	
R92	1Meg			BTS-1Meg	
R93	100KΩ			BTS-100K	
R94	6.8Meg			BTS-6.8Meg	
R95	100KΩ			BTS-100K	
R96	10Meg			BTS-10Meg	
R97	47KΩ			BTS-47K	
R98	4.7Meg			BTS-4.7Meg	
R99	18KΩ	2		BTB-18K	
R100	220KΩ			BTS-220K	
R101	560KΩ			BTS-560K	
R102	82KΩ			BTS-82K	
R103	560KΩ			BTS-560K	
R104	12KΩ			BTS-12K	
R105	10KΩ			BTS-10K	
R106	4300Ω 5%			BTS-4300 5%	
R107	180KΩ			BTS-180K	
R108A B	38.4KΩ		†453214A-1		
R109	1Meg			BTS-1Meg	
R110	680KΩ			BTS-680K	
R111	22KΩ			BTS-22K	
R112	22KΩ			BTS-22K	
R113	47KΩ			BTS-47K	
R114	220KΩ			BTS-220K	
R115	2.2Meg			BTS-2.2Meg	
R116	680Ω	1		BTA-680	
R117	82KΩ	1		BTA-82K	
R118	470Ω	2		BTB-470	

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA CAPEHART PART No.	IRC PART No.	NOTES
R119	1000Ω				
R120	1000Ω				
R121	100KΩ				
R122	100KΩ				
R123	4.7Meg				
R124	820KΩ				
R125	1500Ω				
R126	150Ω				
R127	470KΩ				
R128	6800Ω	1			
R129	1800Ω				
R130	68KΩ				
R131	120KΩ				
R132	470Ω	1		BTA-470	
R133	6800Ω				
R134	150Ω				
R135	680KΩ				
R136	11KΩ	10		PW10-10K	
R137	100KΩ			BTS-100K	
R138	120Ω				
R139	330Ω				
R140	4700Ω	1			
R141	15KΩ			BTS-15K	
R142	1000Ω				
R143	1000Ω				
R144	12KΩ				
R145	4.7Ω			BW½-4.7	
R146	5.6Meg	2			
R147	470KΩ	2			
R148	470KΩ	2			
R149	3.3Ω			BW½-3.3	
R150	1.5Meg				
R151	330KΩ				
R152	390KΩ				
R153	1000Ω 5%				
R154	5600Ω			BTS-5600	
R155	2200Ω			BTS-2200	
R156	2.2Meg			BTS-2.2Meg	
R157	560Ω			BTS-560	
R158	10KΩ			BTS-10K	
R159	3900Ω			BTS-3900	
R160	560Ω			BTS-560	
R161	470Ω	1		BTA-470	
R162	15KΩ	1		BTA-15K	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA CAPEHART PART No.	IRC PART No.	NOTES
R163	1000Ω			BTS-1000	
R164	1Meg				
R165	15KΩ			BTS-15K	
R166	220Ω	1		BTA-220	
R167	1Meg			BTS-1Meg	
R168	1Meg			BTS-1Meg	
R169	15KΩ			BTS-15K	
R170	6200Ω			BTS-8200	
R171	2200Ω			BTS-2200	
R172	560Ω			BTS-560	
R173	330KΩ			BTS-330K	
R174	2700Ω			BTS-2700	
R175	100KΩ			BTS-100K	
R176	10KΩ			BTS-10K	
R177	560Ω	1		BTA-560	
R178	12KΩ	2		BTB-12K	
R179	3300Ω			BTS-3300	
R180	22KΩ	1		BTA-22K	
R181	56KΩ	2		BTB-56K	
R182	6800Ω	1		BTA-6800	
R183	3300Ω			BTS-3300	
R184	560Ω	1		BTA-560	
R185	40KΩ	5			
R186	120KΩ			BTS-120K	
R187	33KΩ			BTS-33K	
R188	82KΩ			BTS-82K	
R189	470KΩ			BTS-470K	
R190	82KΩ			BTS-82K	
R191	470KΩ			BTS-470K	
R192	100KΩ			BTS-100K	
R193	100KΩ			BTS-100K	
R194	560KΩ			BTS-560K	
R195	100KΩ			BTS-100K	
R196	1000Ω			BTS-1000	
R197	100KΩ			BTS-100K	
R198	560KΩ			BTS-560K	
R199	560KΩ			BTS-560K	
R200	330KΩ			BTS-330K	
R201	470KΩ			BTS-470K	
R202	2500Ω	5		PW7-2500	
R203	4700Ω	2		BTB-4700	
R204	6800Ω	1		BTA-6800	
R205	100KΩ			BTS-100K	
R206	100KΩ	1		BTA-100K	

† Items R108A, R108B, C99 are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA CAPEHART PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ 3.1A	180V @ Tap 160V @ .460A	12.6VCT @ 4.8A @ 9.2A	6.3V @ 1.1A	850377C-1					

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA CAPEHART PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T2	Vert. Osc. Trans.		B6701	A-4003	208T9	V402	A-8122	26A04	A-97Y
T3	Horiz. Output Trans.	850379-A							
T4	Vert. Output Trans.	750731A-2	Z1900 ①	A-2823		V307	A-8144	26S72	A-108X
T5A B	Yoke-Horiz. (12MH) Vert. (90MH)	850370-1A							
T6	Horiz. Lin. Coil (.54-1.6MH C. T.)								
T7	Horiz. AFC Pulse Trans.	651144A-1							
T8	Vert. Centering Choke	750798A-1							
T9	Horiz. Centering Choke	651146A-1							
T10	Horiz. Centering Choke		RF800 ② ③ ④	MWC-12 ② ③	215R1 ② ③	201R10 ② ③ ⑤	WC-5 ② ③ ⑤	WC-20 ② ③ ⑥	WC-11 ② ③ ⑤
T11	Horiz. Conv. Phase Coil (2.3-5.5MH)	651145B-1	RF802 ⑦	MWC-6	211R1	201R12 ⑦	WC-8	WC-22	WC-12 ⑥
T12A B C	Green Blue Red } Dynamic Conv. Yoke Assembly								
T13	Dynamic Conv. Inductor Assembly	651147A-1							

① Use 8 to 1 turns ratio.
② Drill new mounting hole(s).
③ Adjust to maximum inductance.
④ Use terminals #1 and #2.
⑤ Use red and blue terminals.
⑥ Use terminals #3 and #4.
⑦ Do not use tap.
⑧ Use blue and green terminals.

TRANSFORMER (AUDIO OUTPUT)

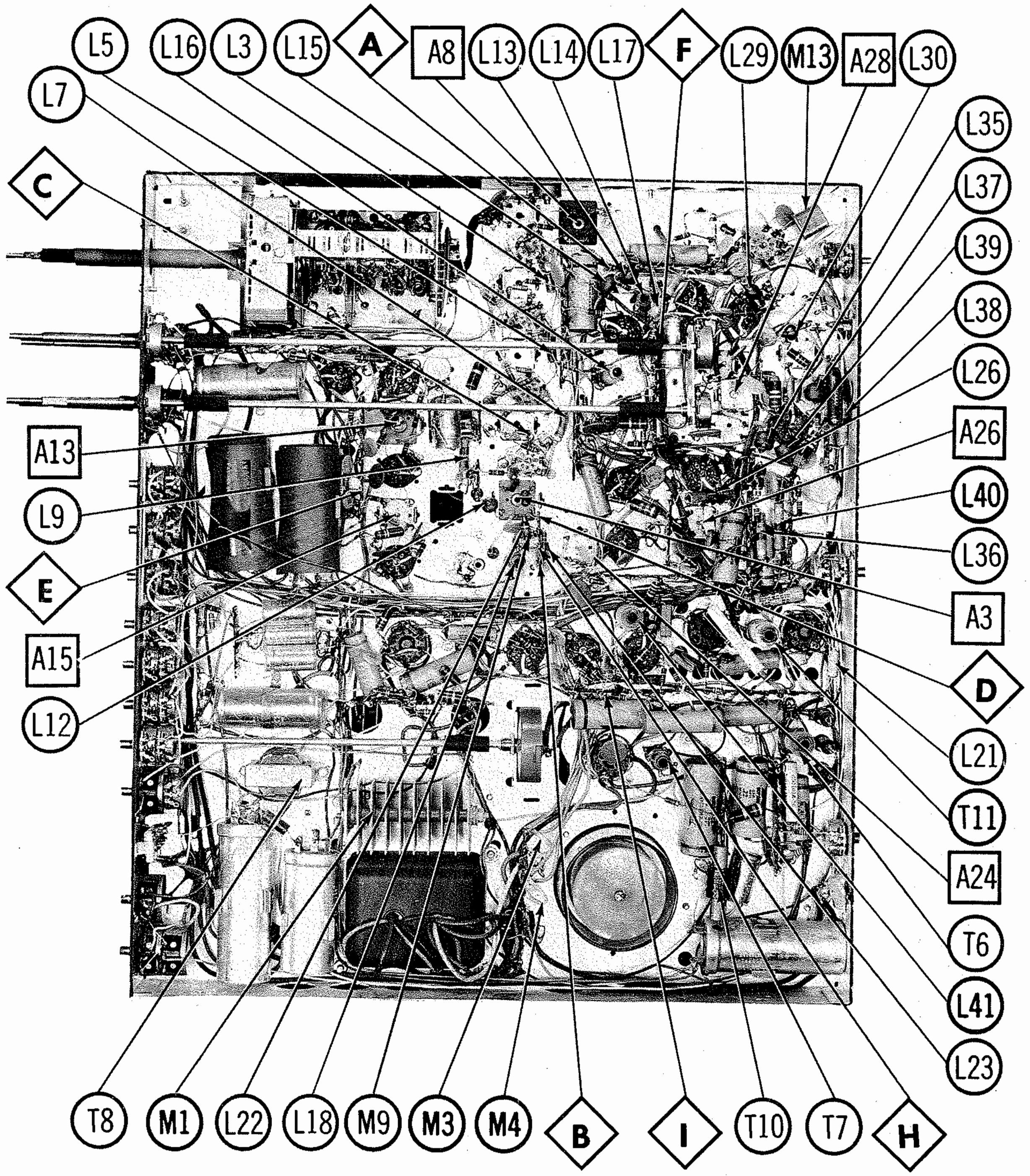
ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA CAPEHART PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T14	8.2KΩ	3-4Ω	650216A-2	Z1002	A2901	A3849	24S61	S-9Z	

SPEAKER

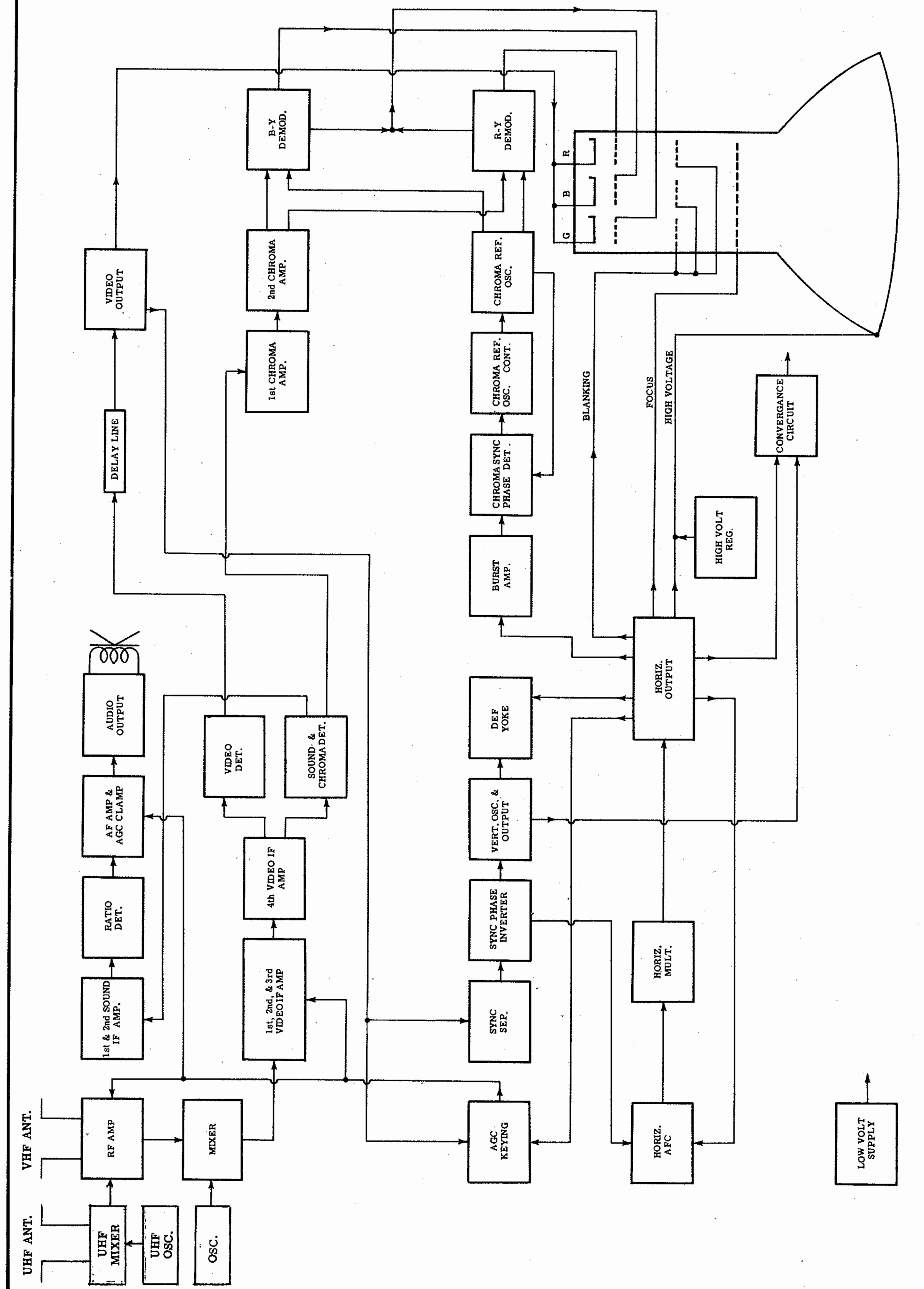
ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA CAPEHART PART No.	QUAM PART No.	RCA TYPE No.	NOTES
SP1	8"	PM	3-4Ω	750797A-1	8A21	20S82	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA CAPEHART PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	1st Video IF	.2Ω	.3Ω	750742B-1				
L2A	41.25MC Trap							
B	47.25MC Trap			750741B-1				
L3	Fil. Choke	0Ω						.6 Microhenries
L4	2nd Video IF	.1Ω	.1Ω	750736A-1				
L5	Fil. Choke	0Ω						.6 Microhenries



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION



BLOCK DIAGRAM

CAPEHART MODEL 31T216M-5 (Ch. CXC-13)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard may be eliminated by removing the .4 amp. fuse located in the high voltage cage.
Remove the AGC amplifier tube (V9) from its socket.

VIDEO IF ALIGNMENT

Connect the negative lead of a 3.5 volt bias supply to the ungrounded side of C57. Connect the positive lead to chassis.
Use only enough sweep generator output to provide usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001MFD	High side to point Ⓒ. Low side to chassis.	44.0MC (10MC Swp)	41.25MC	Any	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.	A1	Adjust to place 41.25MC marker in trap notch as in Fig. 1.
2.	"	"	"	42.75MC 45.75MC	"	"	A2, A3	Adjust for response curve similar to Fig. 1 with markers properly located.
3.	"	"	"	41.25MC 41.65MC 42.75MC 45.75MC	"	Vert. Amp. thru 10KΩ to point Ⓑ. Low side to chassis.		Check for response curve similar to Fig. 2. If necessary, make SLIGHT compromise adjustment of A2 and A3 to obtain desired response. Repeat step 1.
4.	"	High side to pin 1 (grid) of 1st. video IF amplifier (V4). Low side to chassis.	"	41.25MC 42.75MC 45.0MC 45.75MC 47.25MC	"	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.	A4, A5, A6	Adjust for response curve similar to Fig. 3. Adjust A4 to form high frequency side of curve and to position 45.75MC marker. Adjust A5 to form the low frequency side of the curve. A6 is adjusted to correct the response curve tilt.
5.	"	"	"	41.65MC	"	Vert. Amp. thru 10KΩ to point Ⓑ. Low side to chassis.		Retouch A5 to place 41.65MC marker in correct position as shown in Fig. 4.
6.	"	"	"	41.25MC 42.75MC 45.0MC 45.75MC 47.25MC	"	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.		Retouch A4 and A6 if necessary to obtain response curve similar to Fig. 3. DO NOT readjust A5 or step 5 will have to be repeated.
7.	Direct	High side to tube shield floating over converter tube. Low side to chassis.	44MC (10MC Swp)	41.25MC 47.25MC	9	High side thru 10KΩ to point Ⓐ. Low side to chassis.	A7, A8	Preset R21 to mid-range position. Adjust to place markers in trap notches as in Fig. 3.
8.	"	"	"	41.65MC 45.75MC	"	"	A9, A10	Adjust for maximum amplitude and response as in Fig. 3. Repeat step 7. Adjust sound trap adjustment (R21) for maximum trapping action of 41.25MC.

SOUND IF ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Direct	High side to point Ⓓ. Low side to chassis.	Not used	4.5MC (30% 400% AM Mod.)	Any	Vert. Amp. thru detector probe (Fig. 5) to pin 5 (plate) of V24. Low side to chassis.	A11	Adjust for MINIMUM indication on scope.
10.	"	High side to pin 1 (grid) of 2nd. sound IF tube (V11). Low side to chassis.	4.5MC (25KC Swp)	4.5MC	"	Vert. Amp. to point Ⓔ. Low side to chassis.	A12, A13	Adjust for maximum amplitude and symmetry of "S" curve as in Fig. 6.
11.	"	High side to point Ⓓ. Low side to chassis.	4.5MC (25KC Swp)	4.5MC	"	"	A14, A15	Reduce sweep generator output below the limiting level of the 2nd. sound IF coil (L19) indicated by sharp tuning action of A14. Adjust A14 and A15 for maximum amplitude of the "S" curve. Increase sweep generator output and repeat step 10.
12.	"	"	Not used	4.5MC (30% 400% AM Mod.)	"	"	R23	Adjust for MINIMUM AM modulation shown on scope.

VIDEO AMPLIFIER ALIGNMENT

Disconnect L12 from terminal "D" of L10.
Disconnect R73 from pin 1 of the video amplifier (V8).
Disconnect the grounded side of R72 and connect the positive lead of a 3 volt battery to the loose end of R72. Connect the positive lead of the battery to ground.
Connect a 22KΩ resistor from point Ⓕ to chassis. Remove the picture tube socket.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13.	3300Ω Carbon Resistor	High side to loose end of L12. Low side to chassis.	2MC (4MC Swp)	3.1MC 3.58MC	Any	Vert. Amp. thru low capacity probe to point Ⓕ. Low side to chassis.	A16, A17	Adjust A16 to place 3.58MC marker at zero as in Fig. 7. Adjust A17 for maximum gain and response as in Fig. 8. Reconnect L12, R73 and R72. Remove 22KΩ resistor from point Ⓕ to chassis.

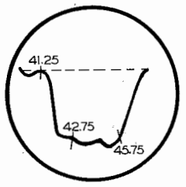


FIG. 1

FIG. 2

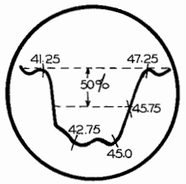


FIG. 3

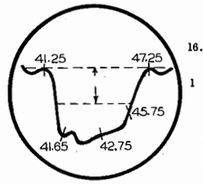


FIG. 4

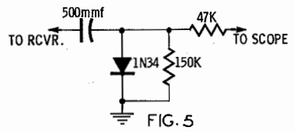


FIG. 5

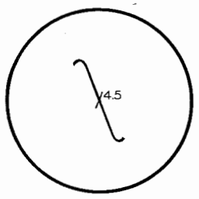


FIG. 6

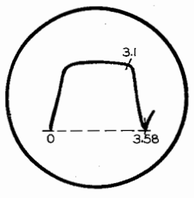


FIG. 7

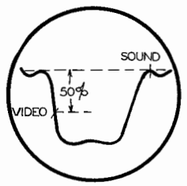


FIG. 8

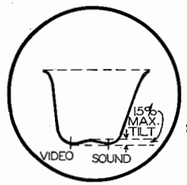


FIG. 9

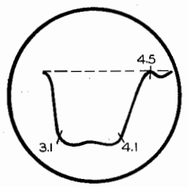


FIG. 10

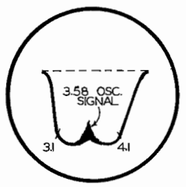


FIG. 11

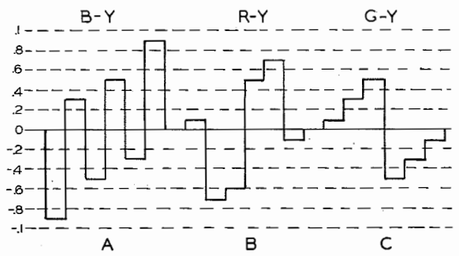


FIG. 12

OSCILLATOR ALIGNMENT

Connect the negative lead of a 1.5 volt bias supply to terminal 9 on the rear of the tuner. Connect the positive lead to chassis.
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	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
14.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. to point Ⓐ. Low side to chassis.	A18	Adjust to place sound marker in trap notch as in Fig. 8. Video marker should be at 50%.
15.	"	"	207MC (10MC Swp)	205.25MC 209.75MC	12	"		Check for video and sound marker placement as in Fig. 8. If necessary, make compromise adjustment of A18 for any individual channel. Check all other high band channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
16.	"	"	85MC (10MC Swp)	83.25MC 87.75MC	6	"	A19	Adjust to place sound marker in trap notch as in Fig. 8.
1	"	"	79MC (10MC Swp)	77.25MC 81.75MC	5			Check for sound and video marker placement as in Fig. 8. If necessary, make compromise adjustment of A19 for any individual channel. Check all other low band channel to make sure that they have not been seriously affected.
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

RF AND MIXER ALIGNMENT

Leave bias connected as under "Oscillator alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizonal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP 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)	211.25MC 215.75MC	13	Vert. Amp. to point Ⓑ. Low side to chassis.	A20, A21	Adjust for maximum of 15% tilt with markers in proper position as in Fig. 8.
19.	"	"	207MC (10MC Swp)	205.25MC 209.75MC	12	"		Check for response curve similar to Fig. 9 on all channels. If necessary, make compromise adjustment of A20 and A21 to obtain desired response. Check all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

UHF TUNER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

CHROMINANCE CHANNEL ALIGNMENT

Connect the vertical amplifier of the scope thru a low capacity probe to terminal "C" of the 3.58MC oscillator transformer (L32) and adjust A22 for maximum peak to peak indication of the 3.58MC signal on the scope.
Remove the burst amplifier tube (V26) to eliminate erroneous indications in the scope trace.
The high voltage may be disabled by removing the horizontal sweep circuit fuse (M7).
Disconnect luminance detector (M9) from point Ⓗ. Set the chroma control fully clockwise and the contrast control fully counter clockwise.

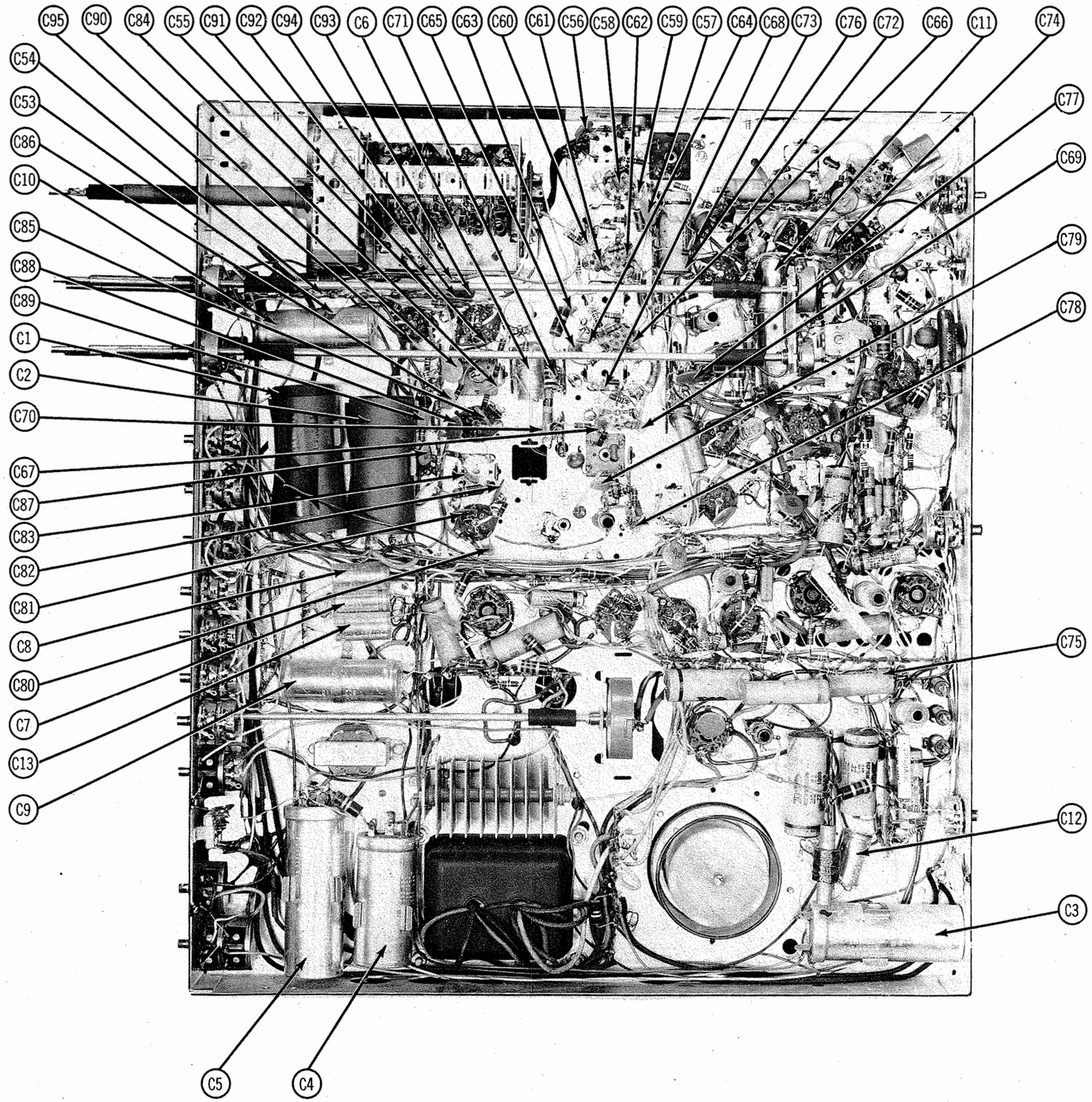
	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
20.	3300Ω Carbon Resistor	High side to point Ⓖ thru 3300Ω. Low side to chassis.	3.75MC (2.5MC Swp)	3.1MC 4.1MC 4.5MC	Any	Vert. Amp. thru detector probe (Fig. 5) to pin (grid) of 6CB6 (V24). Low side to chassis.	A23, A24	Adjust for maximum gain and response as in Fig. 10.
21.	"	"	"	"	"	Vert. Amp. thru detector probe (Fig. 5) to pin 2 (grid) of 6CL6 (V25). Low side to chassis.	A25, A26	"
22.	"	"	"	3.1MC 4.1MC	"	Vert. Amp. thru detector probe (Fig. 5) to pin 1 (plate) of 12BH7 (V29). Low side to chassis.	A27, A28	Adjust for maximum gain and response similar to Fig. 11. Check response at the plate of R-Y demodulator (pin 6 of V29) and retouch A27 and A28 for best compromise if necessary.

COLOR SYNCHRONIZATION ALIGNMENT

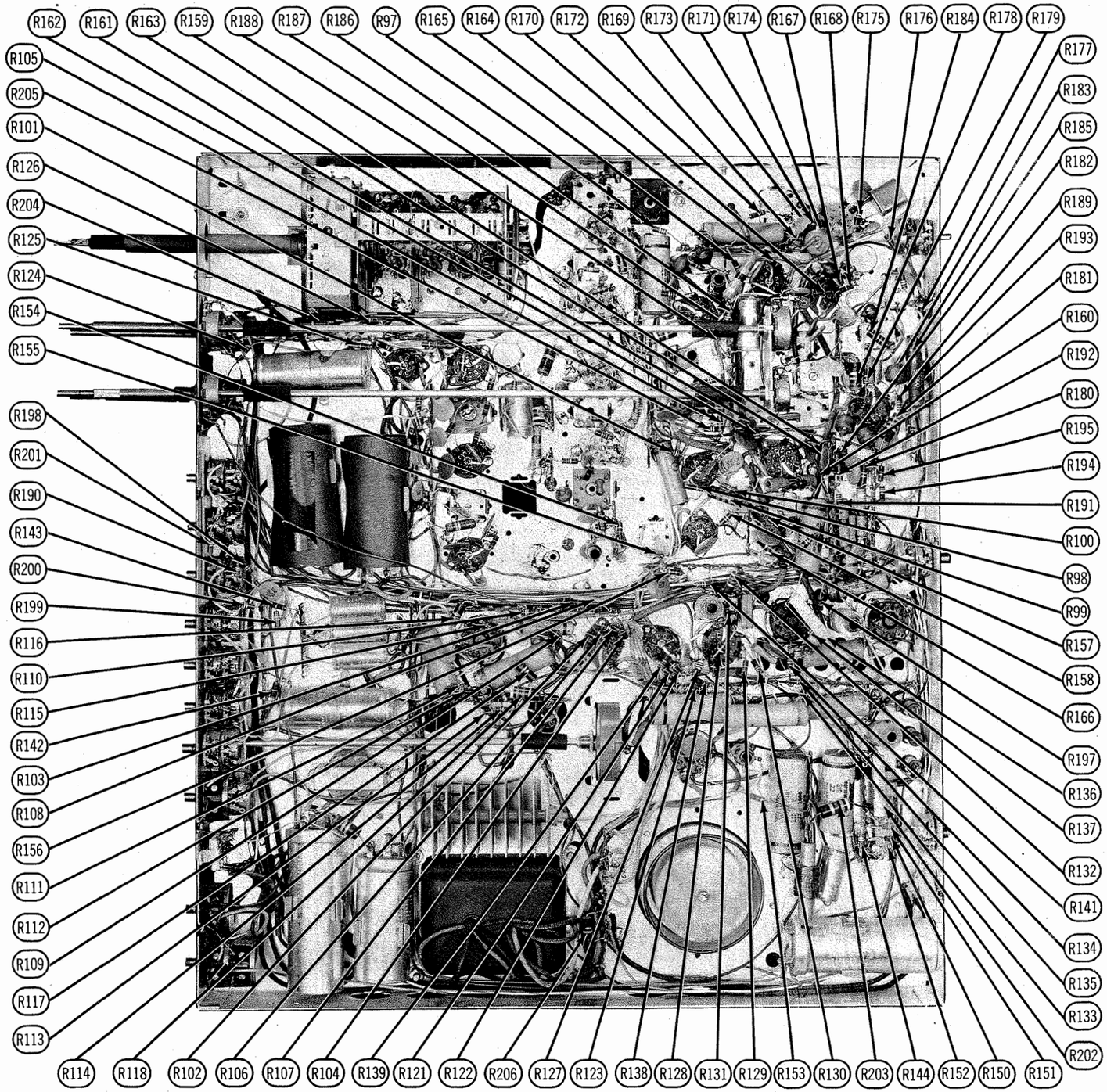
Connect the color bar generator across the antenna terminals and carefully tune the receiver to the color bar pattern.
Connect the low capacity probe of the scope to pin 5 (plate) of the phase detector (V27) and adjust A29 for maximum amplitude of the burst on the scope.
Connect the DC probe of the VTVM to terminal "F" of the "Burst Amplifier" transformer (L28). Disable the 3.58MC oscillator (V28) by connecting a short clip lead from pin 2 of V28 to chassis. Adjust the AFC balance control (R22) so that rotation of the hue control (R5) from one extreme to the other results in an equal change in voltage above and below zero. Remove the short from pin 2 of V28 to chassis and the VTVM. Short terminal "F" of L28 to chassis with a short clip lead. Adjust the reactance tube plate coil (A30) so that the color bars slowly drift back and forth thru the pattern on the picture screen. Remove the short from terminal "F" of L28. The 3.58MC oscillator should now in sync with the bar pattern.

DEMODULATOR ADJUSTMENTS

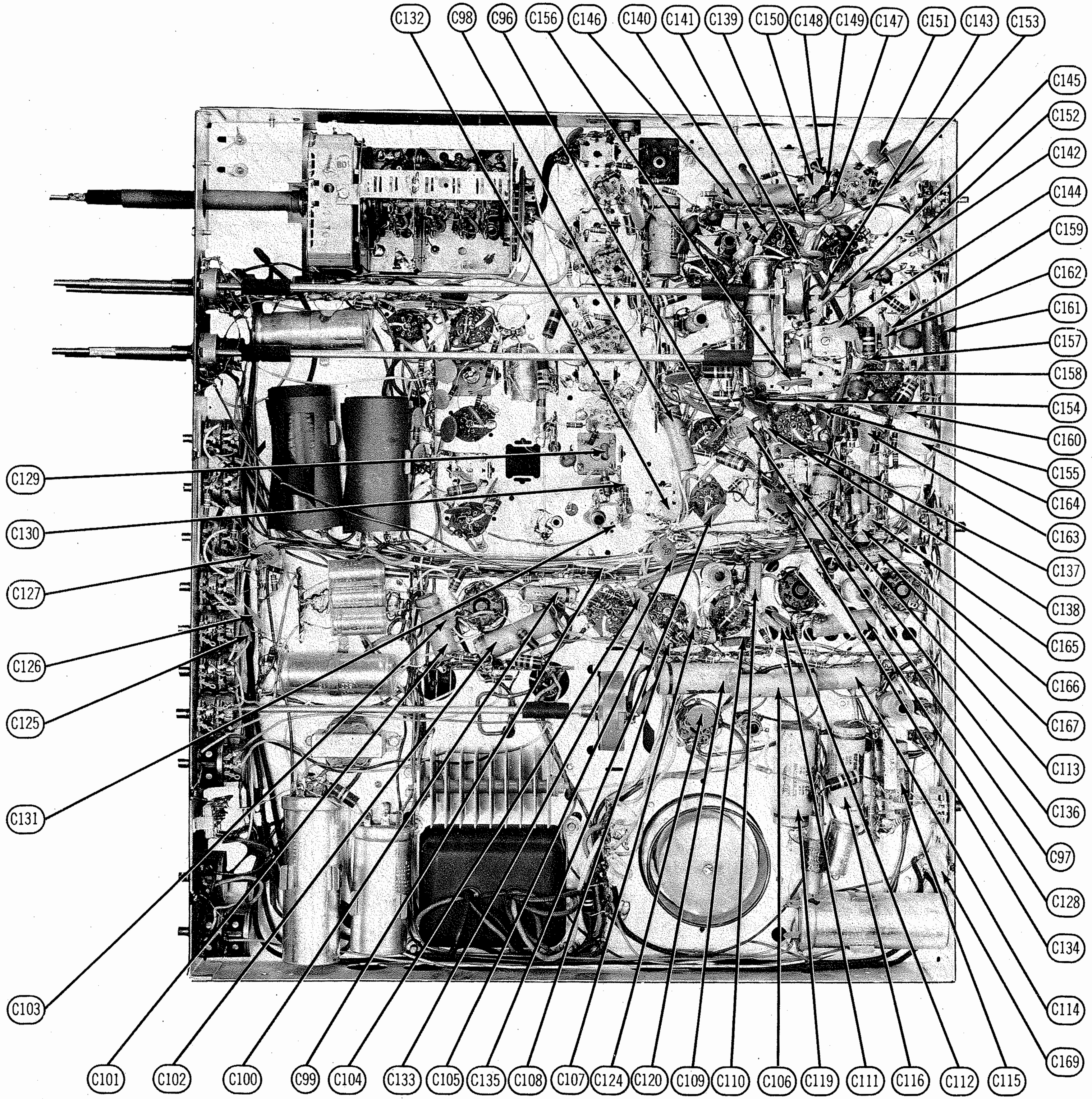
Connect "Color Bar Generator" across the antenna terminals. Connect the vertical amplifier of the scope thru a low capacity probe to the red grid of the picture tube. Low side to chassis.
Set the hue control to mid-position. Adjust A29 until the color bars appear in their proper ratio as in Fig. 12B. When the proper relationship has been obtained, move the scope probe to the blue grid of the picture tube and adjust A31 until the color bars appear in their proper ratio on the scope as seen in Fig. 12A.
Check the waveform on the green grid and compare to Fig. 12C. When ratios cannot be brought within reasonable tolerance, slight corrections can be made with hue and chroma controls.



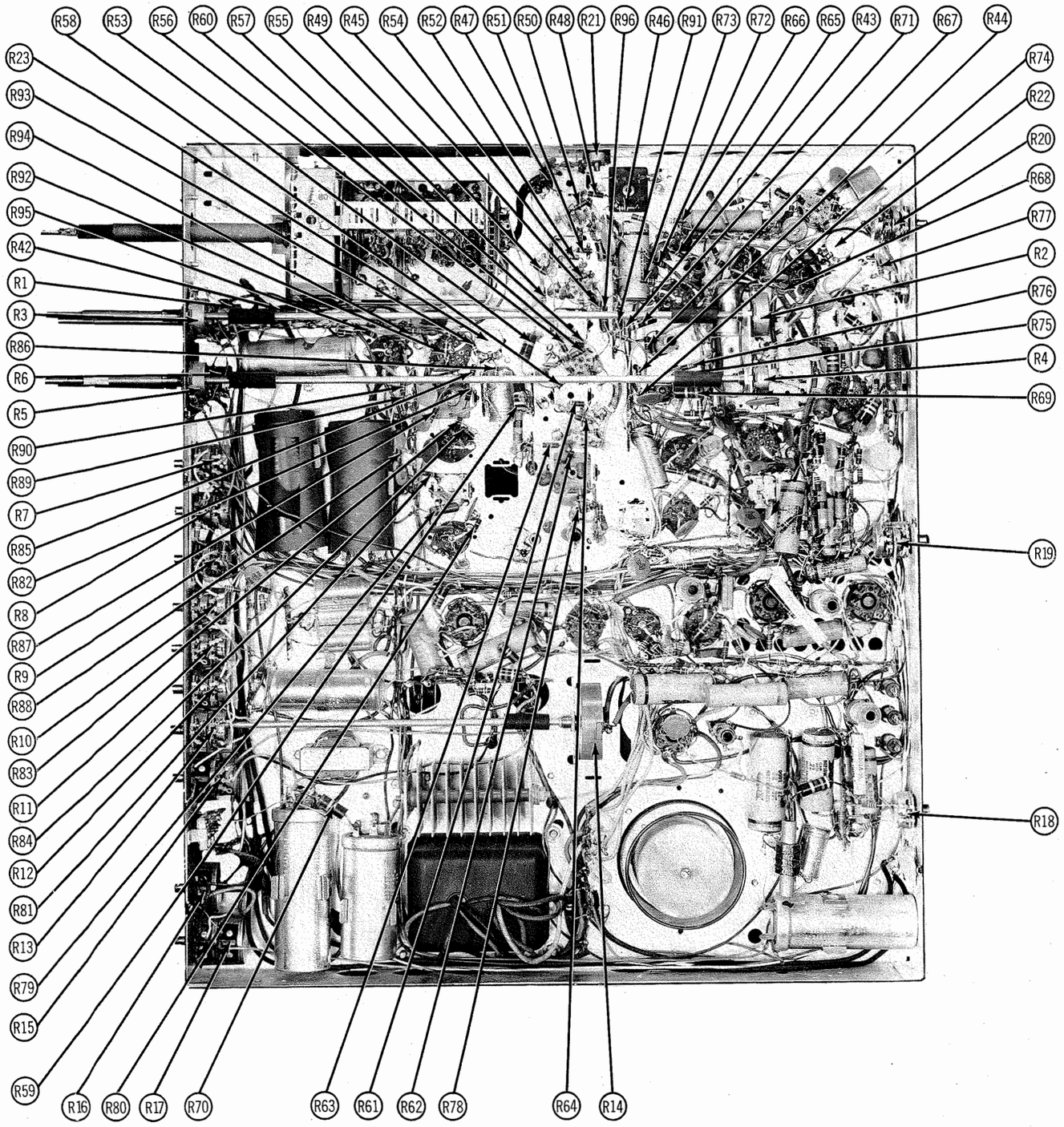
CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION (C1- C95)



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION (R97-R206)



CHASSIS-BOTTOM VIEW-CAPACITOR IDENTIFICATION (C96- C169)



CHASSIS-BOTTOM VIEW-RESISTOR IDENTIFICATION (R1- R96)