

TRADE NAME	Sparton Model 16A211 (Ch. CTV-2)	
MANUFACTURER	Sparton, Division of Sparks-Withington Co., Jackson, Michigan	
TYPE SET	Color Television Receiver	
TUBES	Forty-Four	
POWER SUPPLY	110-120 Volts AC-60 Cycle	RATING 3.8 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13, Video IF 26.25MC, Sound IF 21.75MC (Intercarrier)	

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SPARTON MODEL
16A211 (Ch. CTV-2)

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

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial con-

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DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL - RF-IF CHASSIS

1. Remove 11 push-on type control knobs from front panel of cabinet.
2. Remove 16 wood screws. Remove rear cover.
3. Disconnect picture tube socket, HV leads (2), yoke plug, signal plug, power plug, speaker plug and 2 ground straps.
4. Remove 2 wood screws holding antenna terminal bracket.
5. Remove 4 chassis bolts. Remove RF-IF chassis.

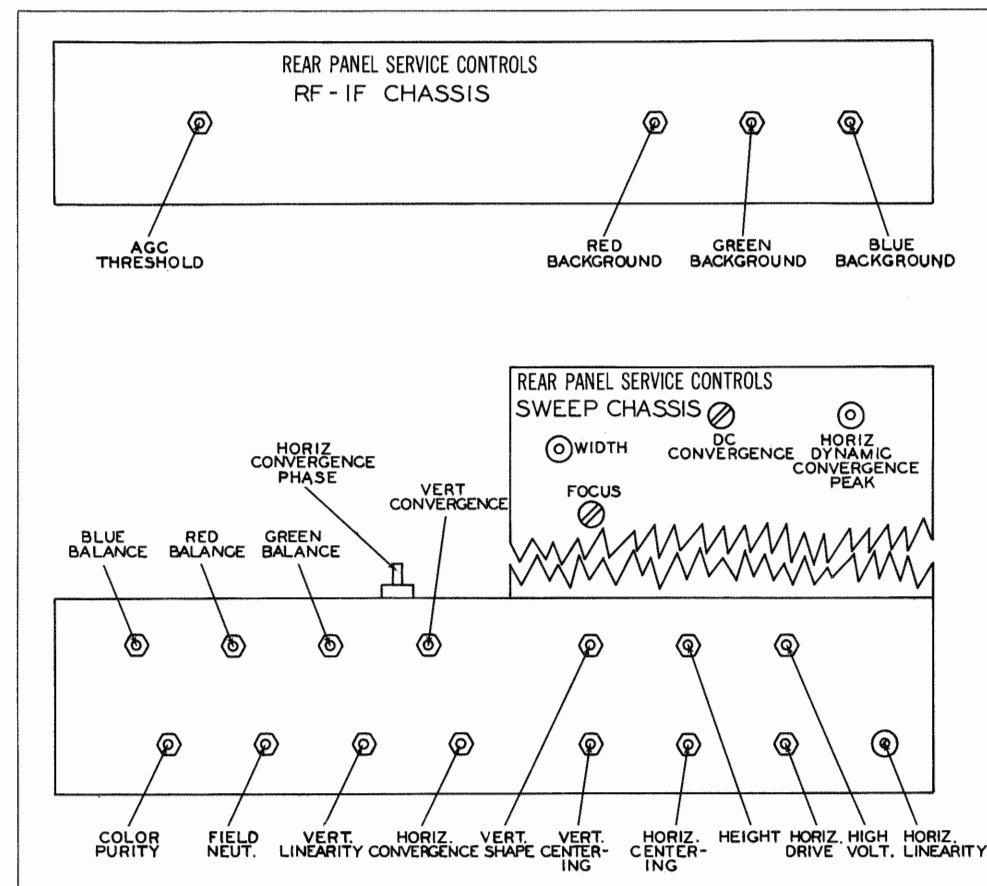
CHASSIS REMOVAL - SWEEP CHASSIS

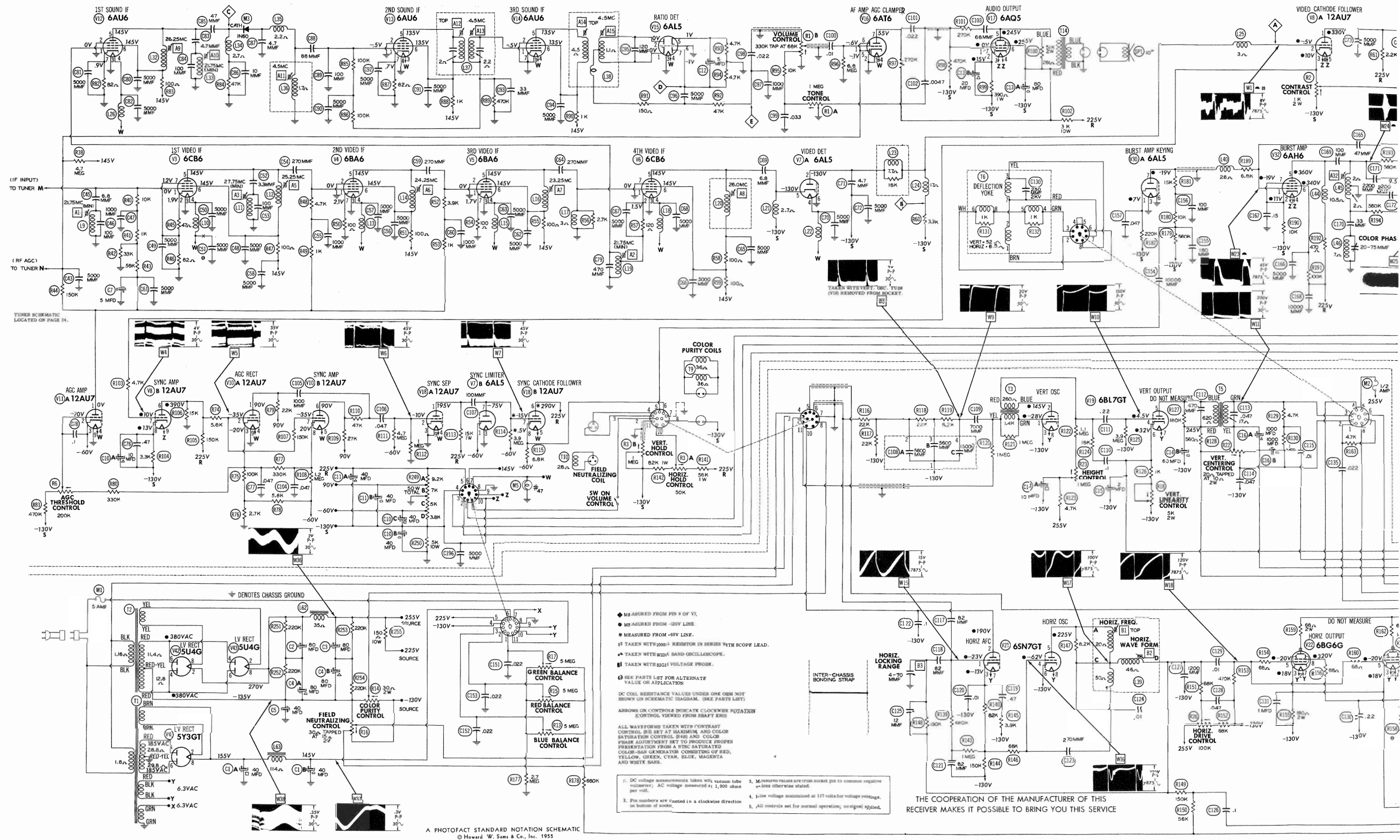
1. Disconnect signal and power plugs from RF-IF chassis, HV leads (2) and picture tube socket.
2. Remove 4 chassis bolts. Remove sweep chassis.

SPEAKER REMOVAL

1. Remove 4 speaker nuts. Remove speaker.

SERVICE ADJUSTMENT LOCATION



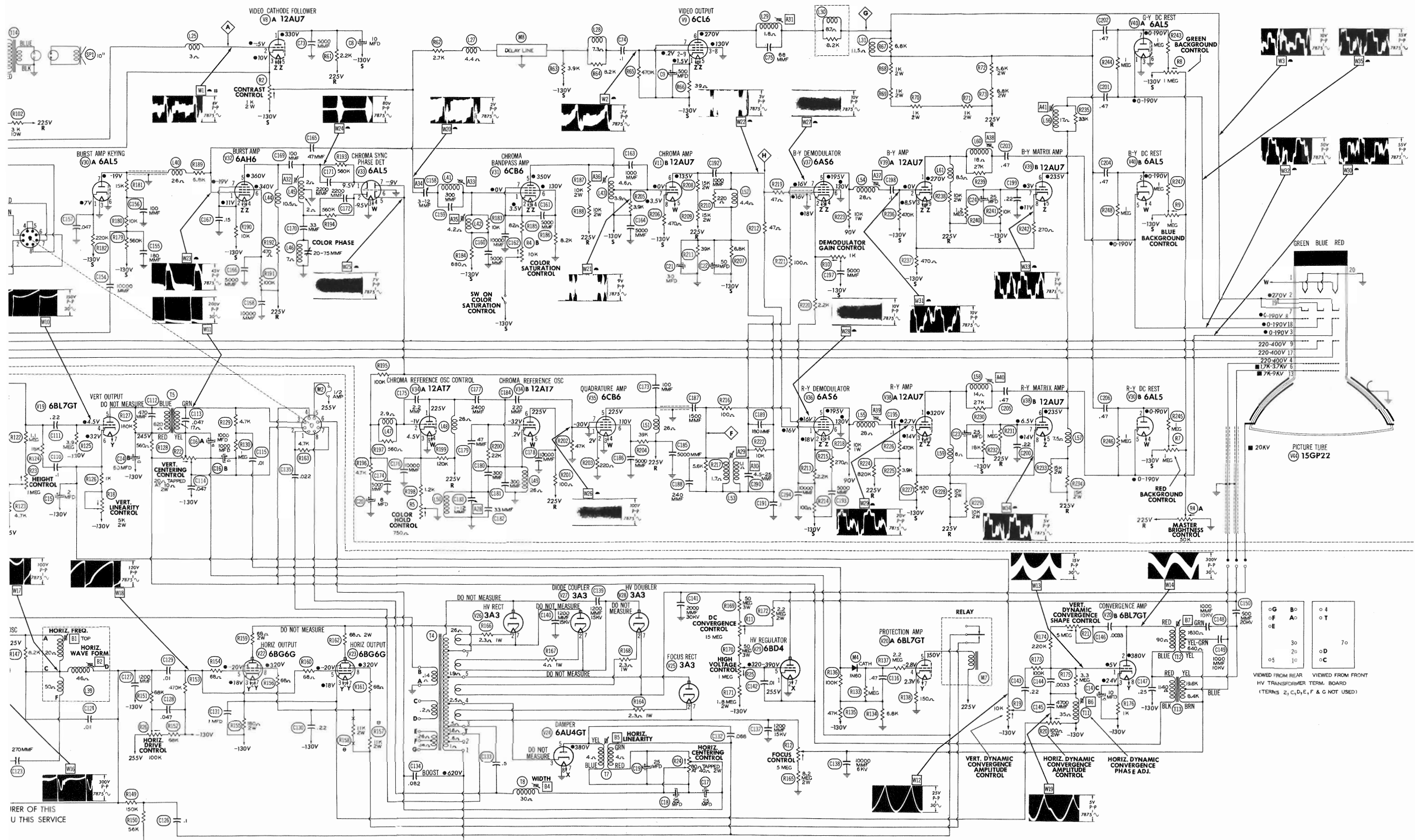


◆ MEASURED FROM PIN 8 OF V1.
 ● MEASURED FROM -130V LINE.
 * MEASURED FROM -60V LINE.
 ▲ TAKEN WITH 100Ω RESISTOR IN SERIES WITH SCOPE LEAD.
 † TAKEN WITH WIDE BAND OSCILLOSCOPE.
 ‡ TAKEN WITH HIGH VOLTAGE PROBE.
 ⊕ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION.
 DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM. (SEE PARTS LIST).
 ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END).
 ALL WAVEFORMS TAKEN WITH CONTRAST CONTROL SET AT MAXIMUM AND COLOR SATURATION CONTROL SET TO PRODUCE PROPER PRESENTATION FROM A PFC 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 1,000 ohms per volt.
 2. Minimum values are from socket pin to common negative unless otherwise stated.
 3. Line voltage maintained at 117 volts for voltage ratings.
 4. All controls set for normal operation; unadjusted.
 5. All controls set for normal operation; unadjusted.

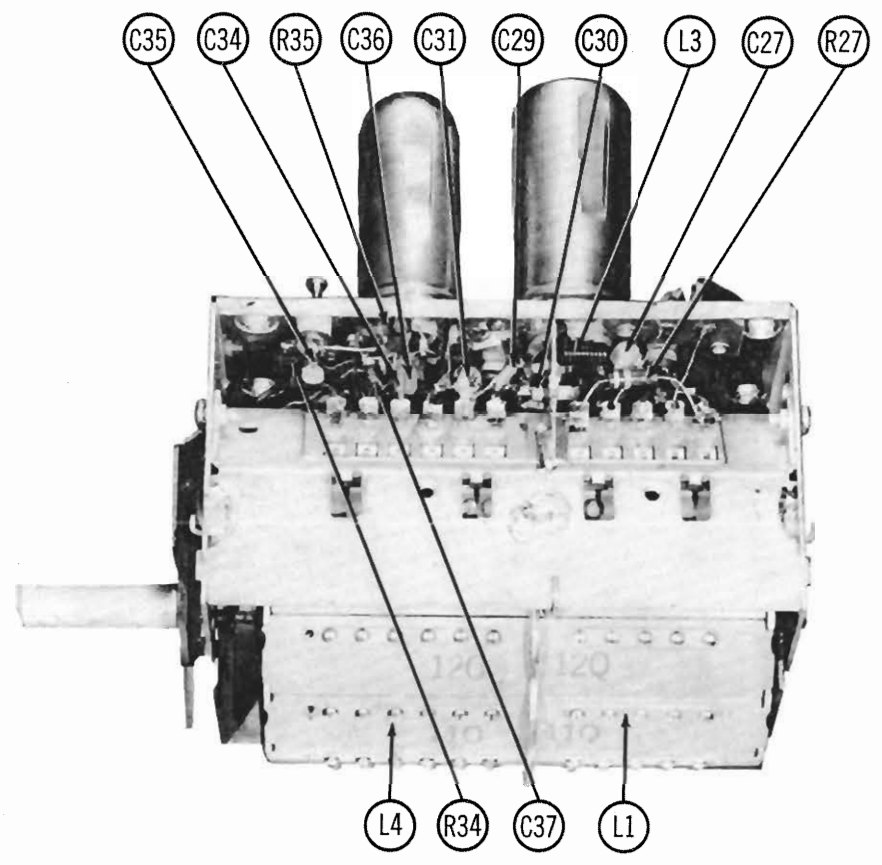
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFAC STANDARD NOTATION SCHEMATIC
 © Howard W. Sams & Co., Inc. 1955

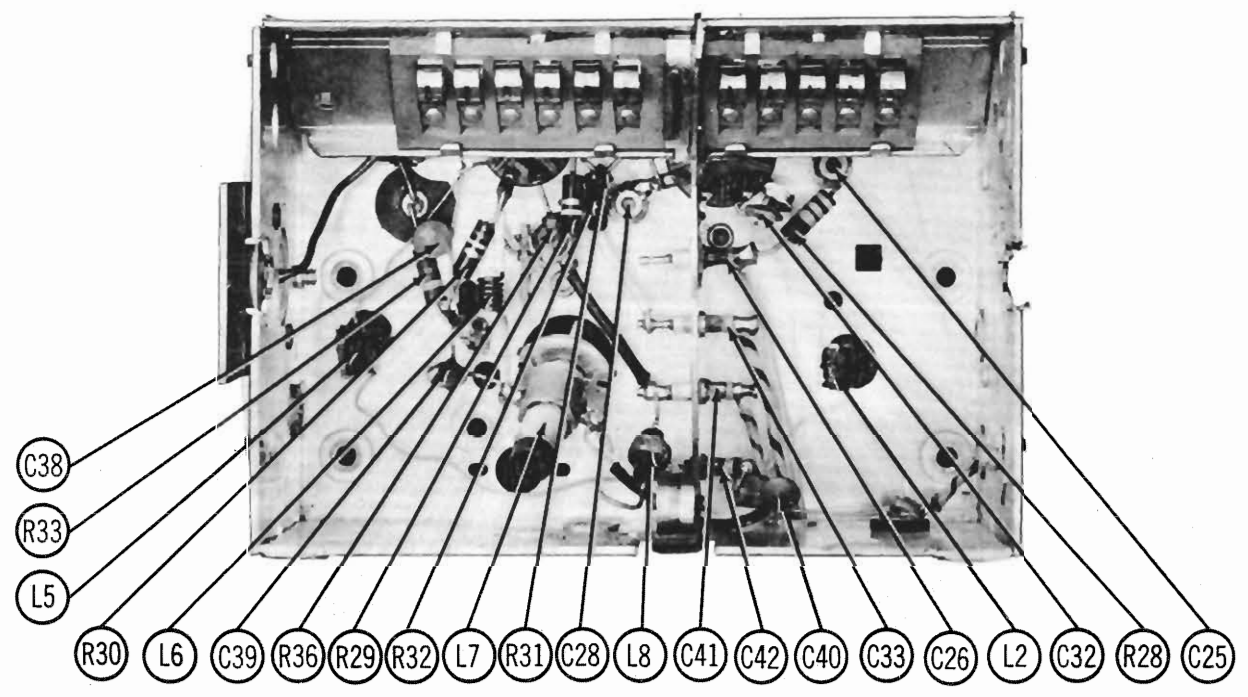


SPARTON MODEL
 16A211 (Ch. CTV-2)

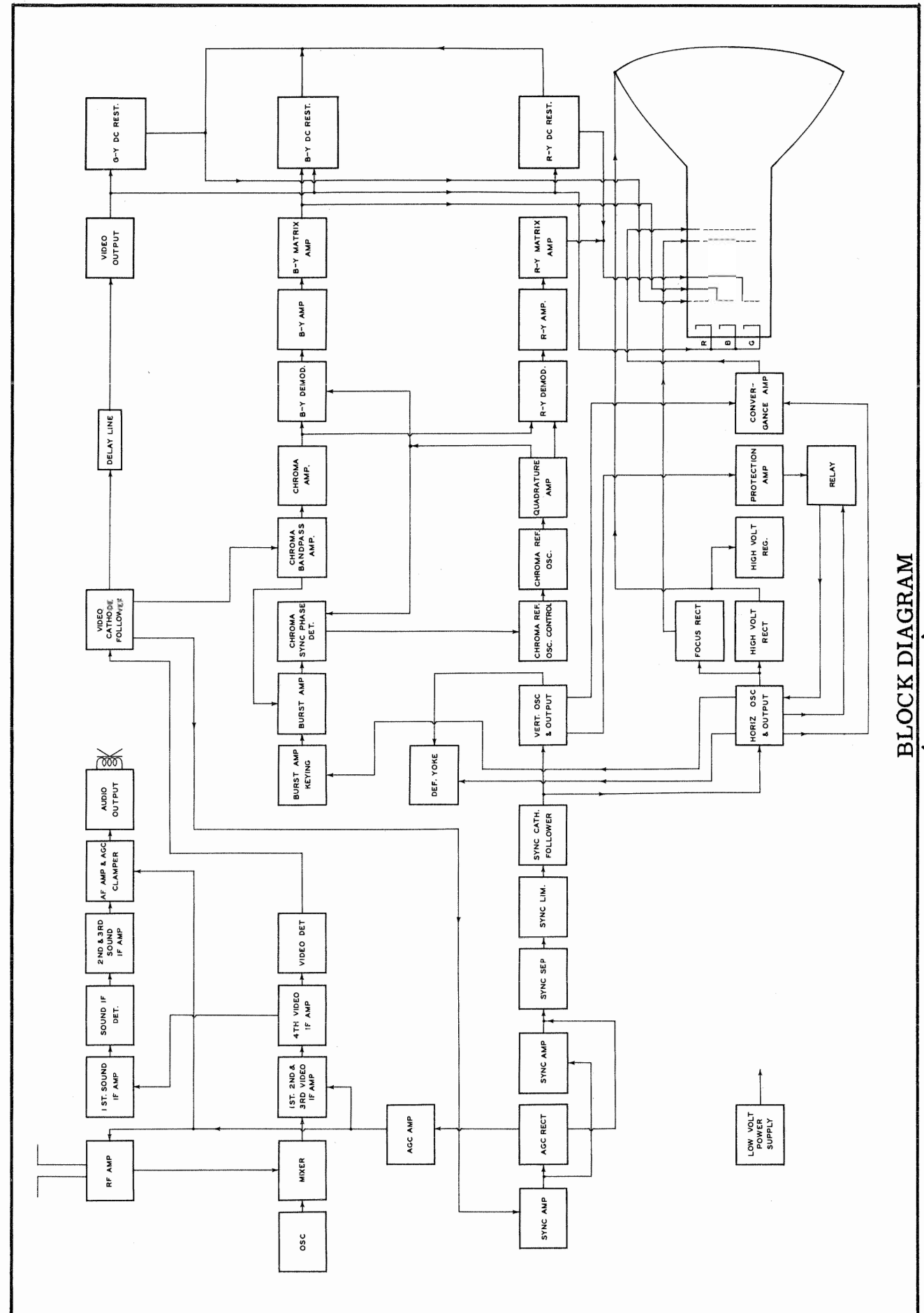
SPARTON MODEL 16A211 (Ch. CTV-2)



RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW

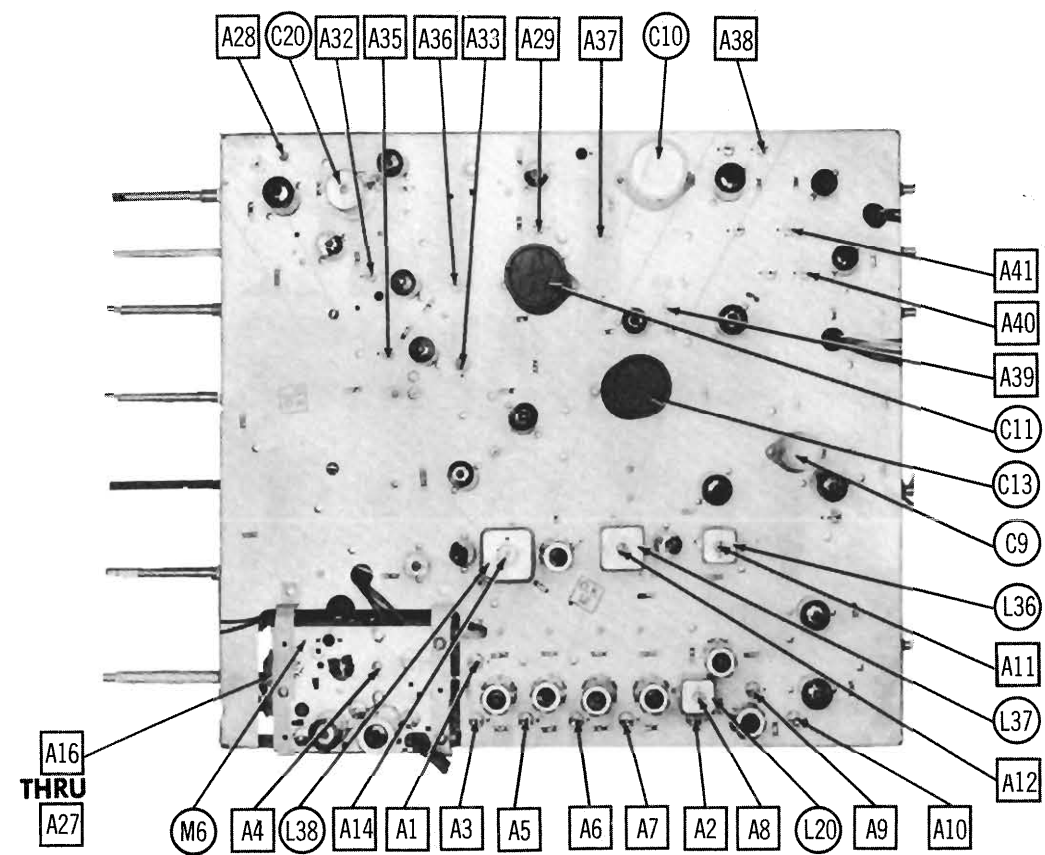


SPARTON MODEL
16A211 (Ch. CTV-2)
BLOCK DIAGRAM

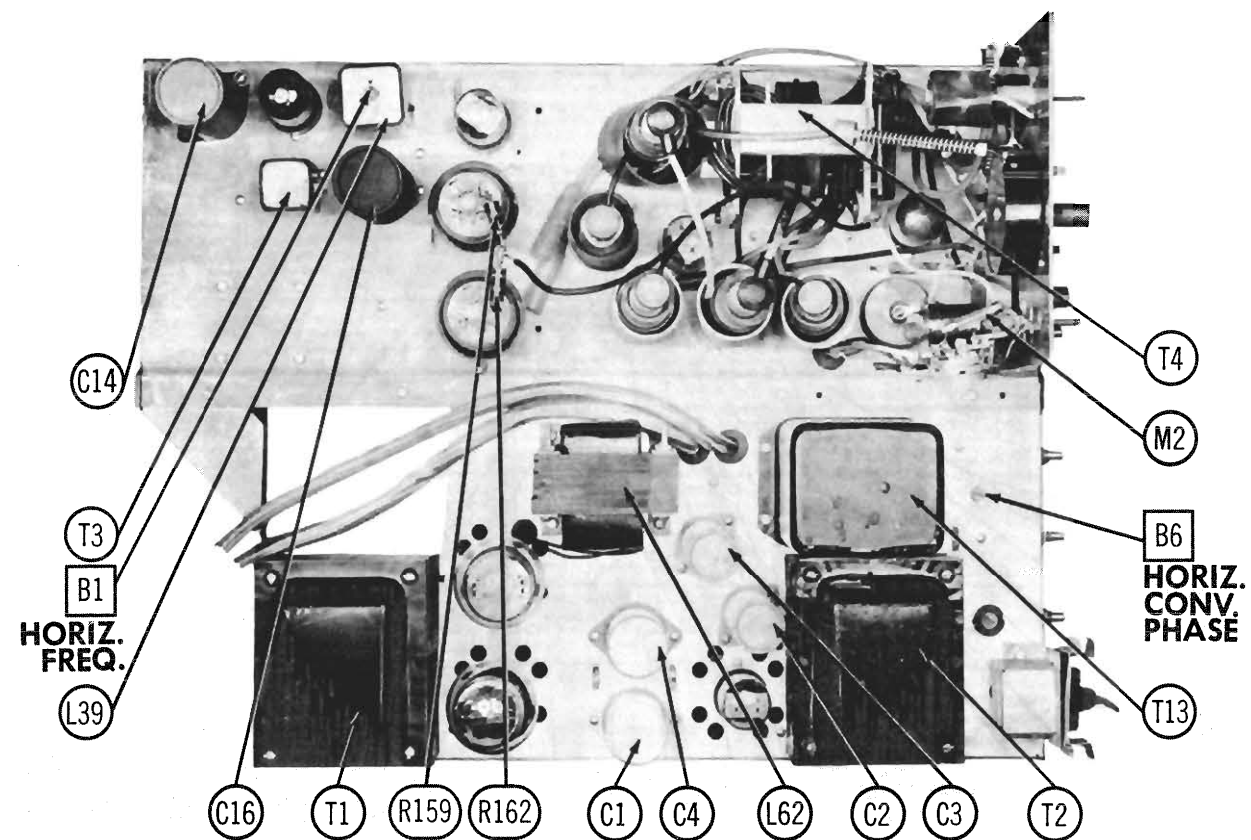
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BZ7	INF	300KΩ	0Ω	.1Ω	0Ω	†2.8KΩ	180KΩ	INF	0Ω
V2	6J6	‡15KΩ	‡250Ω	.1Ω	0Ω	230KΩ	10KΩ	0Ω		
V3	6CB6	45KΩ	130Ω	0Ω	.1Ω	‡250Ω	‡250Ω	82Ω		
V4	6BA6	90KΩ	0Ω	0Ω	.1Ω	‡250Ω	‡250Ω	100Ω		
V5	6BA6	90KΩ	0Ω	0Ω	.1Ω	‡250Ω	‡250Ω	100Ω		
V6	6CB6	3Ω	120Ω	0Ω	.1Ω	‡350Ω	‡250Ω	0Ω		
V7	6AL5	2.5KΩ	6.5KΩ	0Ω	.1Ω	2.5KΩ	0Ω	4Meg		
V8	12AU7	†2.3KΩ	6.5KΩ	3.3KΩ	2.5KΩ	2.5KΩ	†20KΩ	8KΩ	5.8KΩ	2.5KΩ
V9	6CL6	2.5KΩ	470KΩ	†8.5KΩ	2.5KΩ	2.5KΩ	†3.5KΩ	2.5KΩ	†8.5KΩ	470KΩ
V10	12AU7	†30KΩ	20KΩ	90KΩ	.1Ω	.1Ω	†35KΩ	180KΩ	300KΩ	0Ω
V11	12AU7	90KΩ	300KΩ	2.5KΩ	.1Ω	.1Ω	†30KΩ	2.5KΩ	3KΩ	0Ω
V12	6AU6	0Ω	0Ω	0Ω	.1Ω	‡250Ω	‡250Ω	82Ω		
V13	6AU6	700KΩ	0Ω	.1Ω	0Ω	†1.1KΩ	†1.1KΩ	82Ω		
V14	6AU6	470KΩ	0Ω	0Ω	.1Ω	†1.1KΩ	†1.1KΩ	0Ω		
V15	6AL5	INF	INF	0Ω	.1Ω	4.7KΩ	0Ω	4.7KΩ		
V16	6AT6	6.8Meg	0Ω	0Ω	.1Ω	240KΩ	240KΩ	†275KΩ		
V17	6AQ5	470KΩ	3KΩ	2.5KΩ	2.5KΩ	†3.5KΩ	†3.2KΩ	470KΩ		
V18	12AU7	†15KΩ	1Meg	0Ω	.1Ω	.1Ω	†200Ω	4Meg	9KΩ	0Ω
V19	6BL7GT	1.4Meg	†1.5Meg	2.5KΩ	4Meg	†1.4KΩ	4.4KΩ	2.5KΩ	2.5KΩ	
V20	6BL7GT	3.3Meg	†1.4KΩ	3.5KΩ	2.5Meg	†5.5KΩ	150Ω	2.5KΩ	2.5KΩ	
V21	6SN7GT	1.8Meg	†50KΩ	250KΩ	210KΩ	†110KΩ	2.5KΩ	2.5KΩ	2.5KΩ	
V22	6BG6G	TP	2.5KΩ	2.7KΩ	TP	470KΩ	TP	2.5KΩ	†85.5KΩ	
V23	6BG6G	TP	2.5KΩ	2.7KΩ	NC	470KΩ	TP	2.5KΩ	†85.5KΩ	
V24	6AU4GT	TP	NC	300KΩ	TP	†150Ω	TP	.1Ω	0Ω	
V25	3A3	15Meg	15Meg	15Meg	INF	15Meg	15Meg	15Meg	INF	TOP CAP ‡2.5Ω
V26	3A3		PINS 1 - 8	HAVE	INF	RESISTANCE				TOP CAP ‡30Ω
V27	3A3		PINS 1 - 8	HAVE	INF	RESISTANCE				TOP CAP ‡INF
V28	3A3	100Meg	100Meg	100Meg	INF	100Meg	100Meg	100Meg	INF	TOP CAP INF
V29	6BD4	†200Ω	0Ω	TP	TP	2Meg	NC	.1Ω	TP	TOP CAP 100Meg
V30	6AL5	220KΩ	†1.1Meg	0Ω	.1Ω	†2Meg	0Ω	600KΩ		
V31	6CB6	3.2KΩ	7KΩ	2.5KΩ	2.5KΩ	†20KΩ	†16KΩ	7KΩ		
V32	6AH6	600KΩ	12.5KΩ	2.5KΩ	2.5KΩ	†600Ω	†100KΩ	12.5KΩ		
V33	6AL5	560KΩ	560KΩ	0Ω	.1Ω	INF	0Ω	INF		
V34	12AT7	†200Ω	INF	1.6KΩ	.1Ω	.1Ω	†300Ω	22KΩ	26Ω	0Ω
V35	6CB6	47KΩ	220Ω	0Ω	.1Ω	†200Ω	†39KΩ	0Ω		
V36	6AS6	8KΩ	4.8KΩ	2.5KΩ	2.5KΩ	†16KΩ	†8.5KΩ	8KΩ		
V37	6AS6	8KΩ	4.8KΩ	2.5KΩ	2.5KΩ	†16KΩ	†8.5KΩ	8KΩ		
V38	12AU7	†5.2KΩ	470KΩ	3.3KΩ	2.5KΩ	2.5KΩ	†8KΩ	20KΩ	3.3KΩ	2.5KΩ
V39	12AU7	†10KΩ	470KΩ	3KΩ	2.5KΩ	2.5KΩ	†8KΩ	12KΩ	3.3KΩ	2.5KΩ
V40	6AL5	†2Meg	†1.1Meg	0Ω	.1Ω	†2Meg	0Ω	†1.1Meg		
V41	5Y3GT	NC	150KΩ	NC	29Ω	NC	30Ω	NC	150KΩ	
V42	5U4G	TP	8.5KΩ	NC	2.5KΩ	NC	2.5KΩ	NC	8.5KΩ	
V43	5U4G	NC	8.5KΩ	NC	2.5KΩ	NC	2.5KΩ	NC	8.5KΩ	
V44	15GP22	.1Ω	†3.5KΩ	†2Meg	‡600KΩ	NC	15Meg	†3.5KΩ	†2Meg	‡1.8Meg
		PIN 10	PIN 11	PIN 12	PIN 13	PIN 14	PIN 15	PIN 16	PIN 17	PIN 18
		NC	NC	NC	100Meg	NC	NC	NC	‡600KΩ	†2Meg
		PIN 19	PIN 20							
		†3.5KΩ	0Ω							

† MEASURED FROM PIN 2 OF V43.
 ‡ MEASURED FROM PIN 8 OF V41.
 ‡ MEASURED FROM PIN 3 OF V24.
 TP - TIE POINT.
 NC - NO CONNECTION.
 § MEASURED WITH RELAY CONTACTS (M7) CLOSED.



RF-IF CHASSIS-TOP VIEW



SWEEP CHASSIS-TOP VIEW

SPARTON MODEL
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ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Remove the horizontal oscillator tube (V21) from its socket. This will eliminate the high voltage shock hazard.

VIDEO IF ALIGNMENT

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. Connect the negative lead of a 4.5 volt bias supply to the ungrounded side of C7. Connect the positive lead to chassis. In step 1 adjust A2 starting with slug turned maximum clockwise (out of coil).

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. Low side to chassis.	21.75MC (Unmod)	Any	DC probe to point \diamond . Common to point \diamond .	A1, A2	Increase signal generator to provide usable reading on VTVM. Adjust for MINIMUM deflection.
2. "	"	27.75MC	"	"	A3	"
3. "	"	22.2MC	"	"	A4	Attenuate generator output for approximately 1.5 volts at VTVM. Adjust for maximum deflection.
4. "	"	25.25MC	"	"	A5	"
5. "	"	24.25MC	"	"	A6	"
6. "	"	23.25MC	"	"	A7	"
7. "	"	26.0MC	"	"	A8	"

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. Use only enough sweep generator output for usable pattern on scope.

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8. Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	24MC (10MC Swp)	21.75MC 22.5MC 22.4MC 24.0MC 25.5MC 26.25MC 27.75MC	Any	Vert. amp. thru 47K Ω to point \diamond . Low side to point \diamond .		Check for response curve similar to Fig. 1. If necessary retouch A3 thru A8 for desired response. Increase sweep generator and marker generator output to observe 21.75MC and 27.75MC trap markers. If necessary, SLIGHTLY retouch A1 and A2 to place 21.75 MC marker in trap notch. Retouch A3 to place 27.75MC marker in trap notch.

SOUND IF ALIGNMENT

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9. Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	26.25MC (Unmod)	Any	DC probe to ungrounded side of C86. Common to chassis.	A9	Attenuate signal generator output to produce not more than 1.5 volts at VTVM. Adjust for maximum deflection.
10. "	"	21.75MC	"	"	A10	Adjust for MINIMUM deflection.
11. .01MFD	High side to point \diamond . Low side to chassis.	4.5MC (Unmod)	"	DC probe to point \diamond . Common to chassis.	A11, A12, A13, A14	Adjust signal generator to produce not more than 8 volts at VTVM at maximum adjustment. Adjust A11, A12, A13 and A14 for maximum deflection.
12. "	"	"	"	DC probe to point \diamond . Common to chassis.	A15	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
13. "	"	"	"	DC probe to point \diamond . Common to chassis.		Readjust A12, A13 and A14 SLIGHTLY for maximum deflection on VTVM. Repeat step 12.

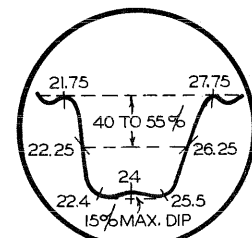


FIG. 1

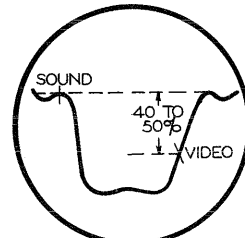


FIG. 2

ALIGNMENT INSTRUCTIONS (cont)

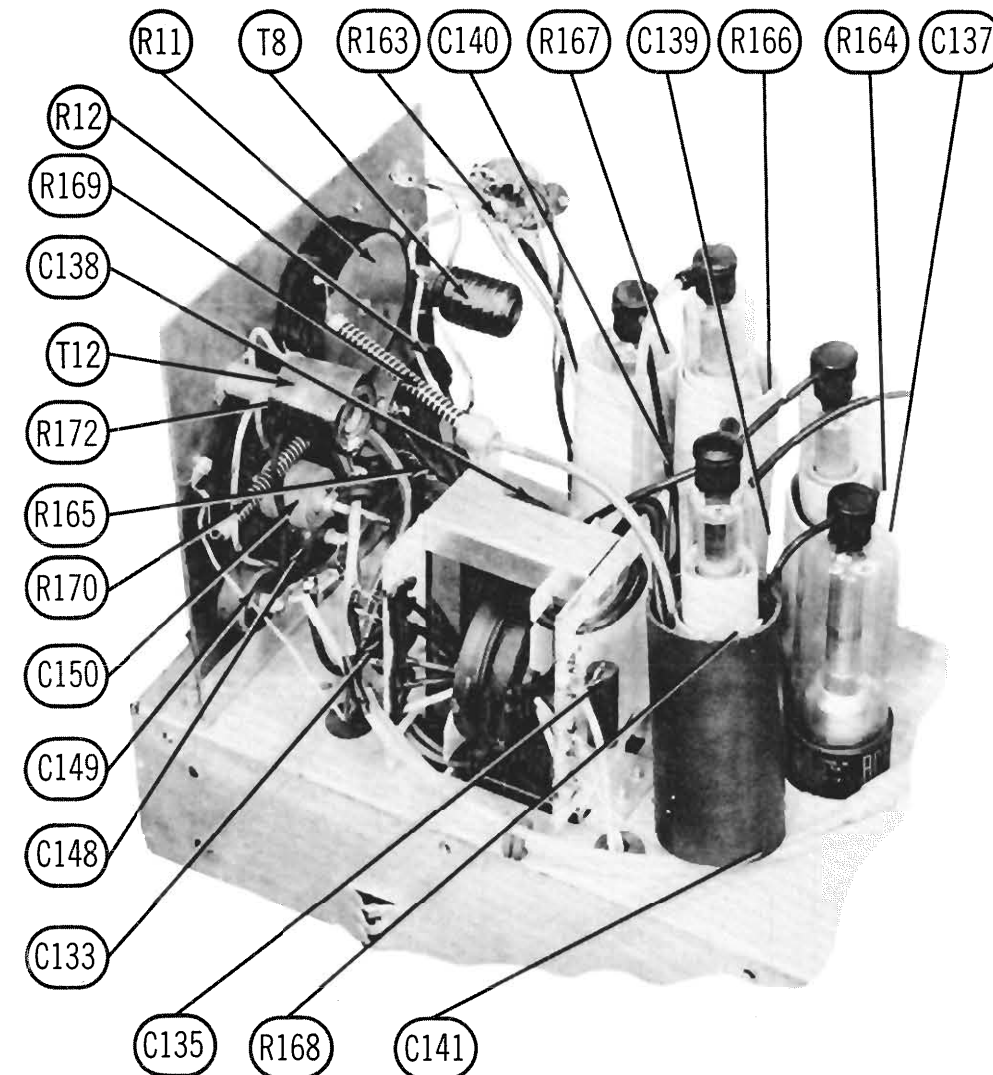
OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket. Connect bias as under "Video IF Alignment". The channel adjustment screws are reached thru 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. 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 120 Ω Carbon Resistors	Across antenna terminals with 120 Ω in each lead.	57MC (10MC Swp) 83MC (10MC Swp) 69MC (10MC Swp) 79MC (10MC Swp) 85MC (10MC Swp) 177MC (10MC Swp) 183MC (10MC Swp) 189MC (10MC Swp) 195MC (10MC Swp) 201MC (10MC Swp) 207MC (10MC Swp) 213MC (10MC Swp)	55.25MC 59.75MC 61.25MC 65.75MC 67.25MC 71.75MC 77.25MC 81.75MC 83.25MC 87.75MC 175.25MC 179.75MC 181.25MC 185.75MC 187.25MC 191.75MC 193.25MC 197.75MC 199.25MC 203.75MC 205.25MC 209.75MC 211.25MC 215.75MC	2 3 4 5 6 7 8 9 10 11 12 13	Vert. Amp. thru 10K Ω to point \diamond . Low side to point \diamond .	A16 A17 A18 A19 A20 A21 A22 A23 A24 A25 A26 A27	Adjust to place sound marker in trap notch as in Fig. 2. Video marker should fall at 40 to 55% on high frequency slope of response curve. Replace V21 in its socket.

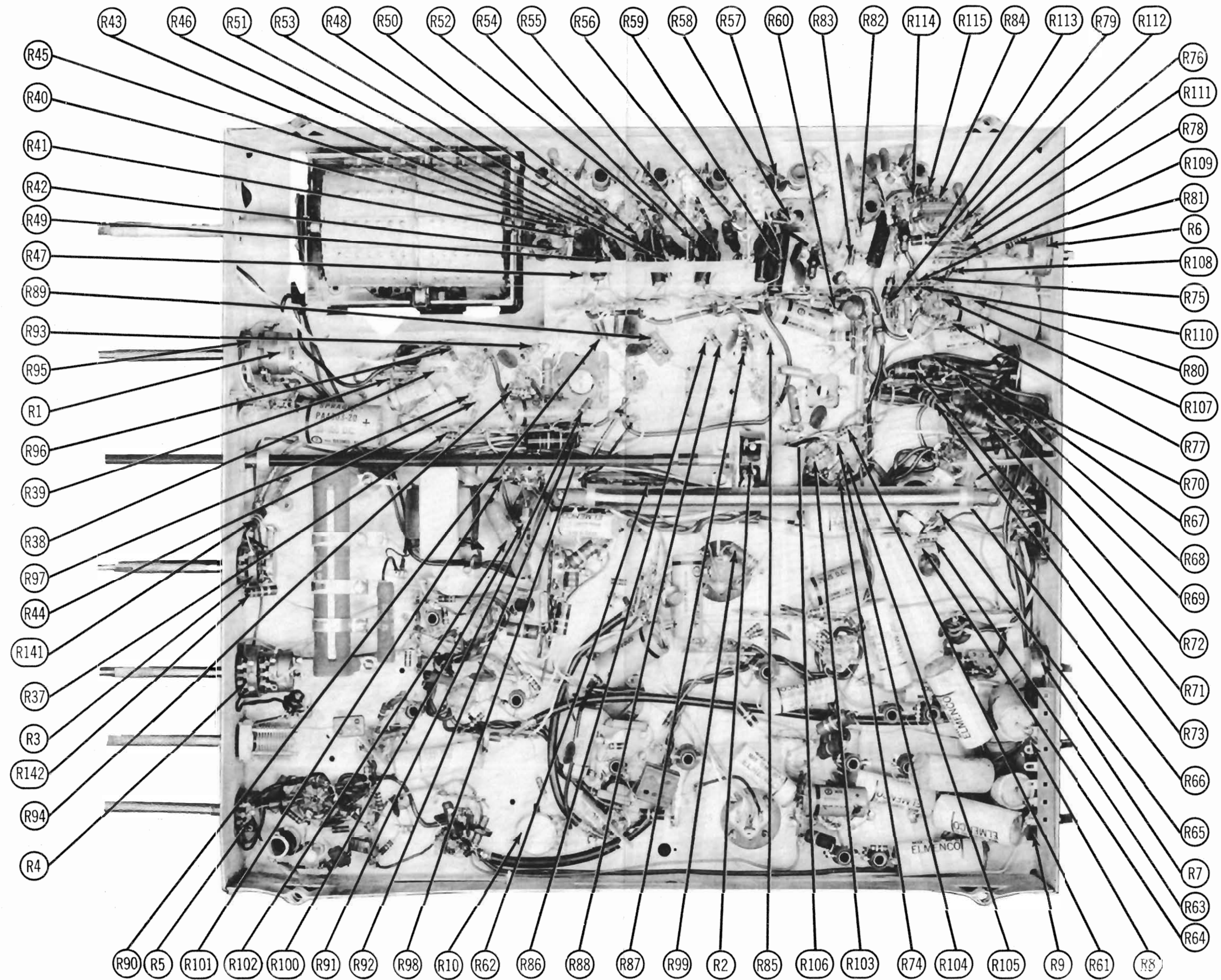
RF AND MIXER ALIGNMENT

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



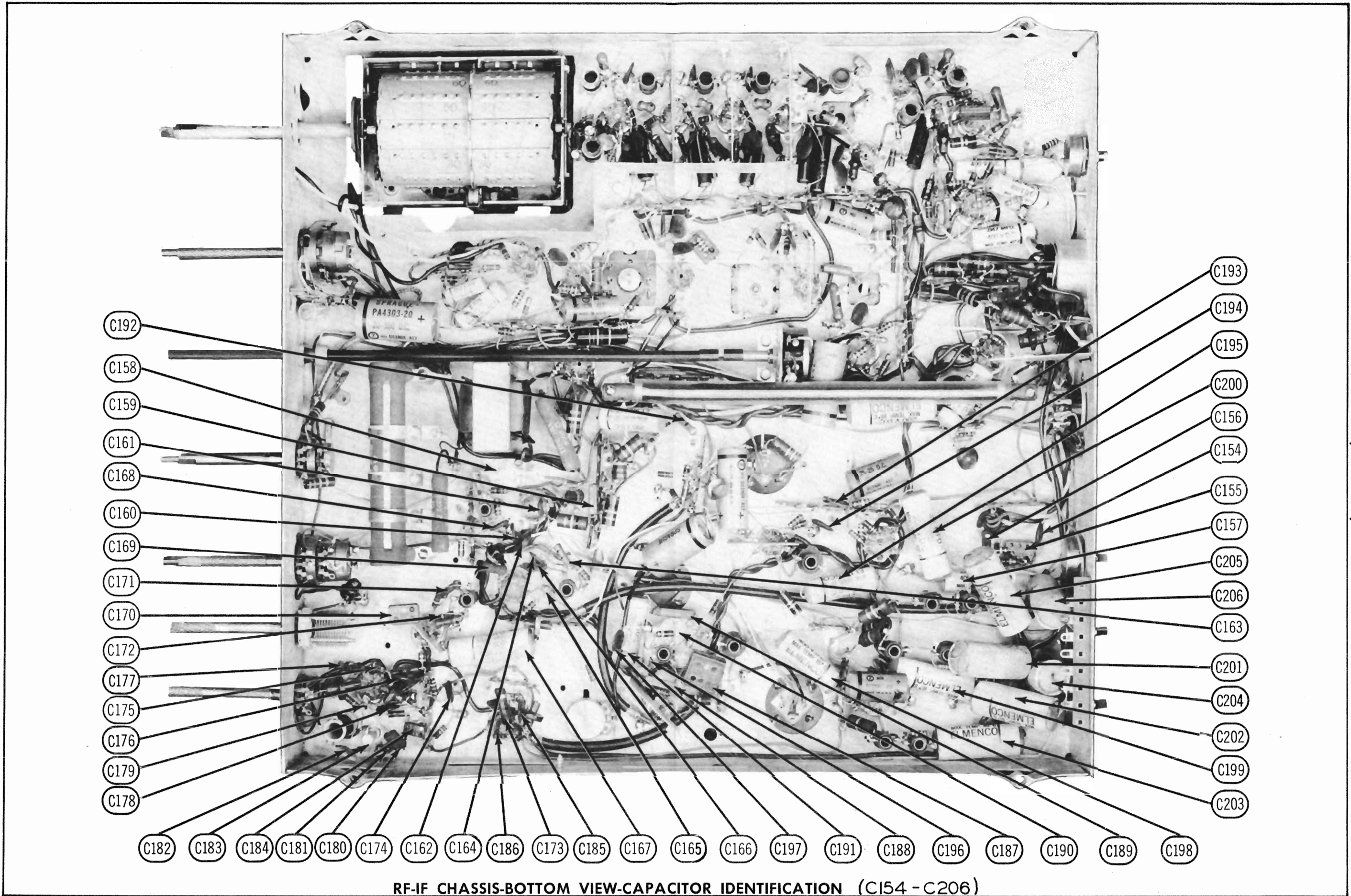
HIGH VOLTAGE COMPARTMENT

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16A211 (Ch. CTV-2)



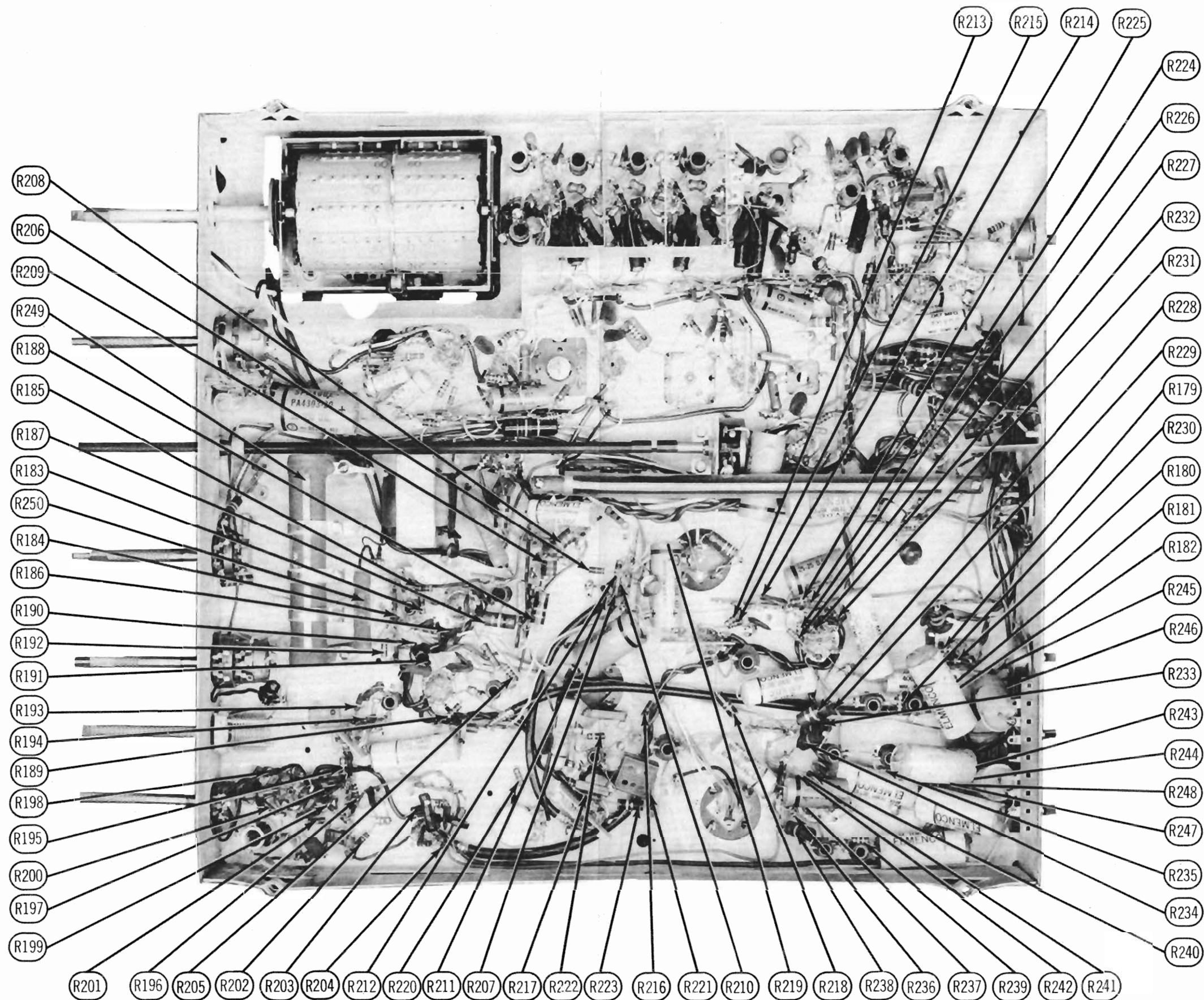
RF-IF CHASSIS-BOTTOM VIEW-RESISTOR IDENTIFICATION (R1 - R142)

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16A211 (Ch. CTV-2)



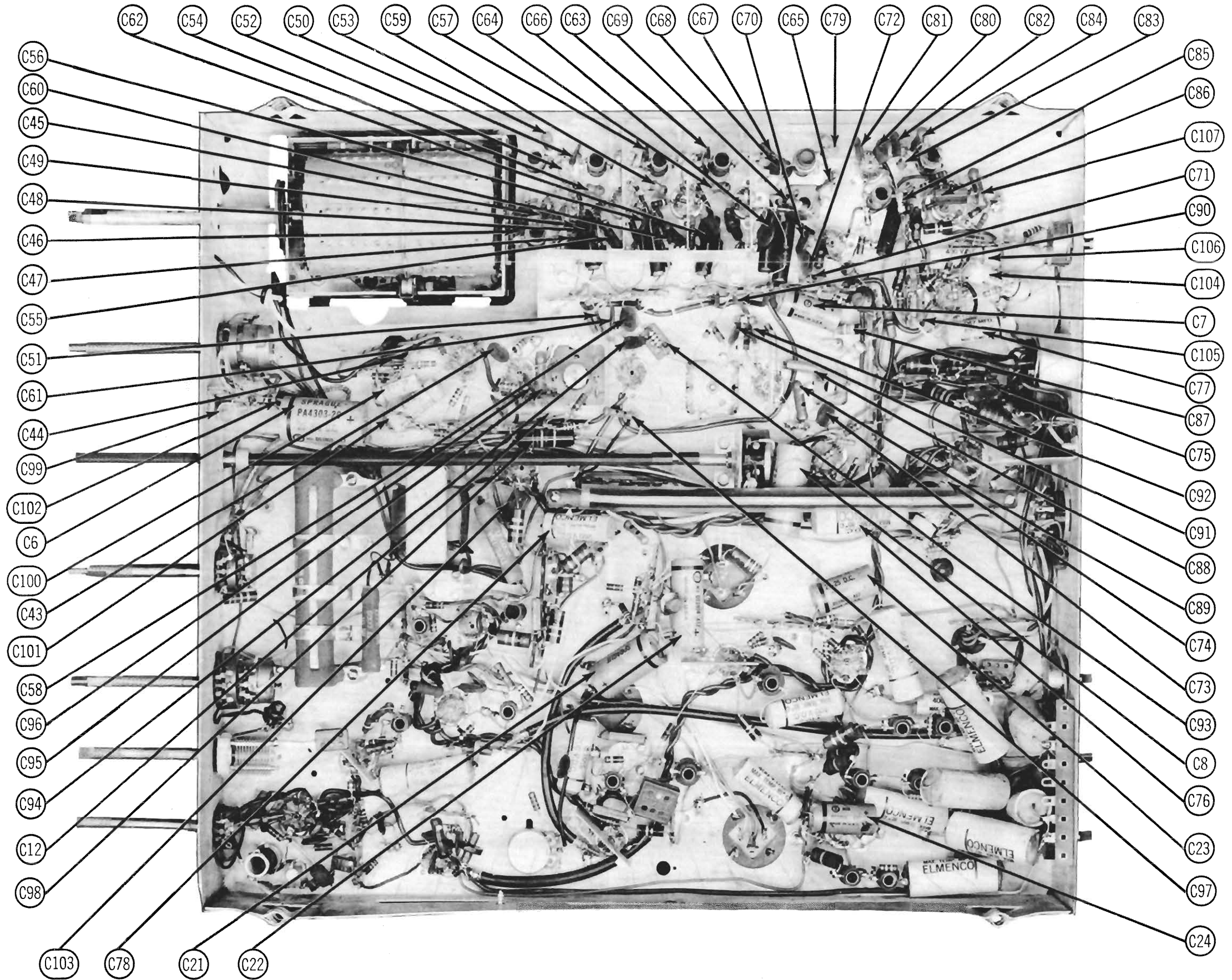
RF-IF CHASSIS-BOTTOM VIEW-CAPACITOR IDENTIFICATION (C154 - C206)

SPARTON MODEL
16A211 (Ch. CTV-2)



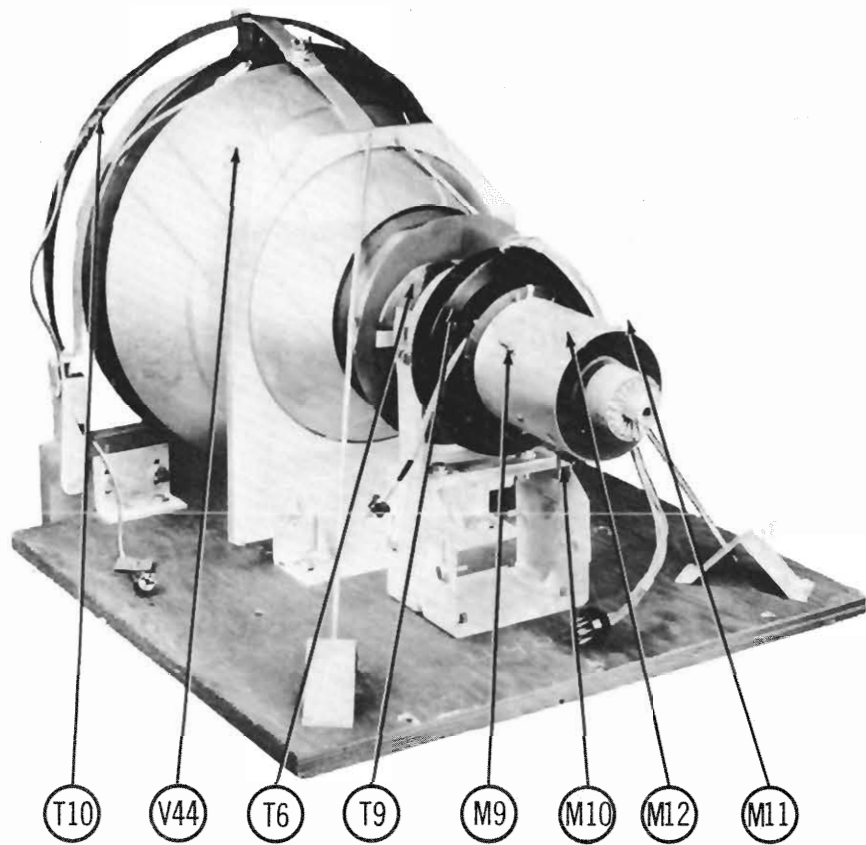
RF-IF CHASSIS-BOTTOM VIEW-RESISTOR IDENTIFICATION (R179 -R248)

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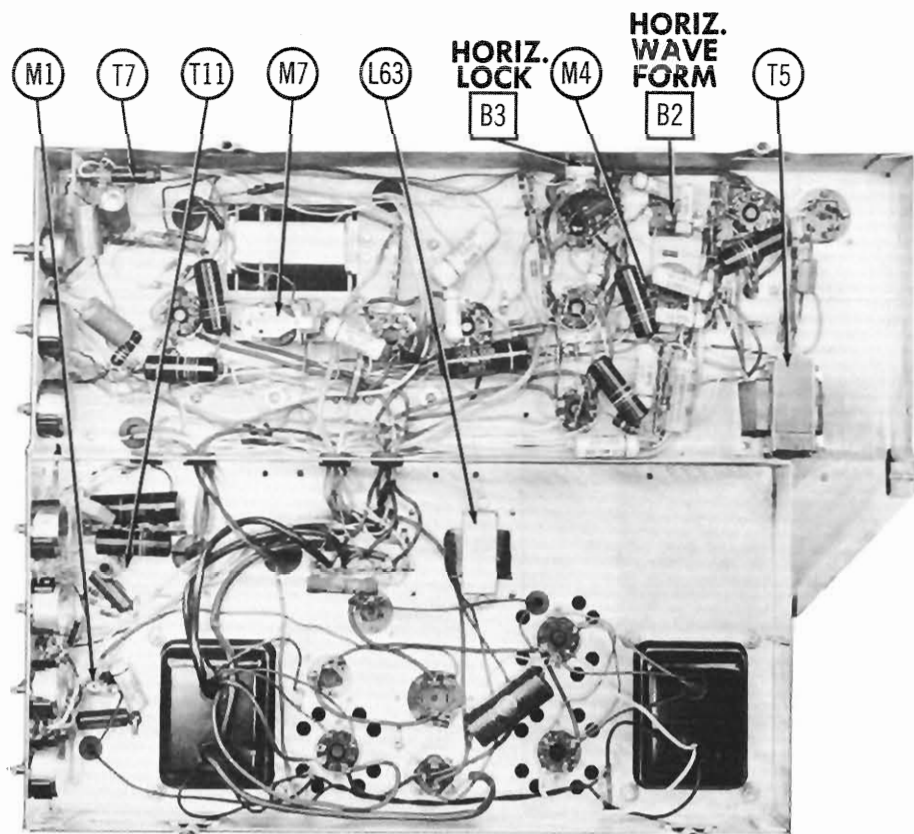


RF-IF CHASSIS-BOTTOM VIEW-CAPACITOR IDENTIFICATION (C7-C107)

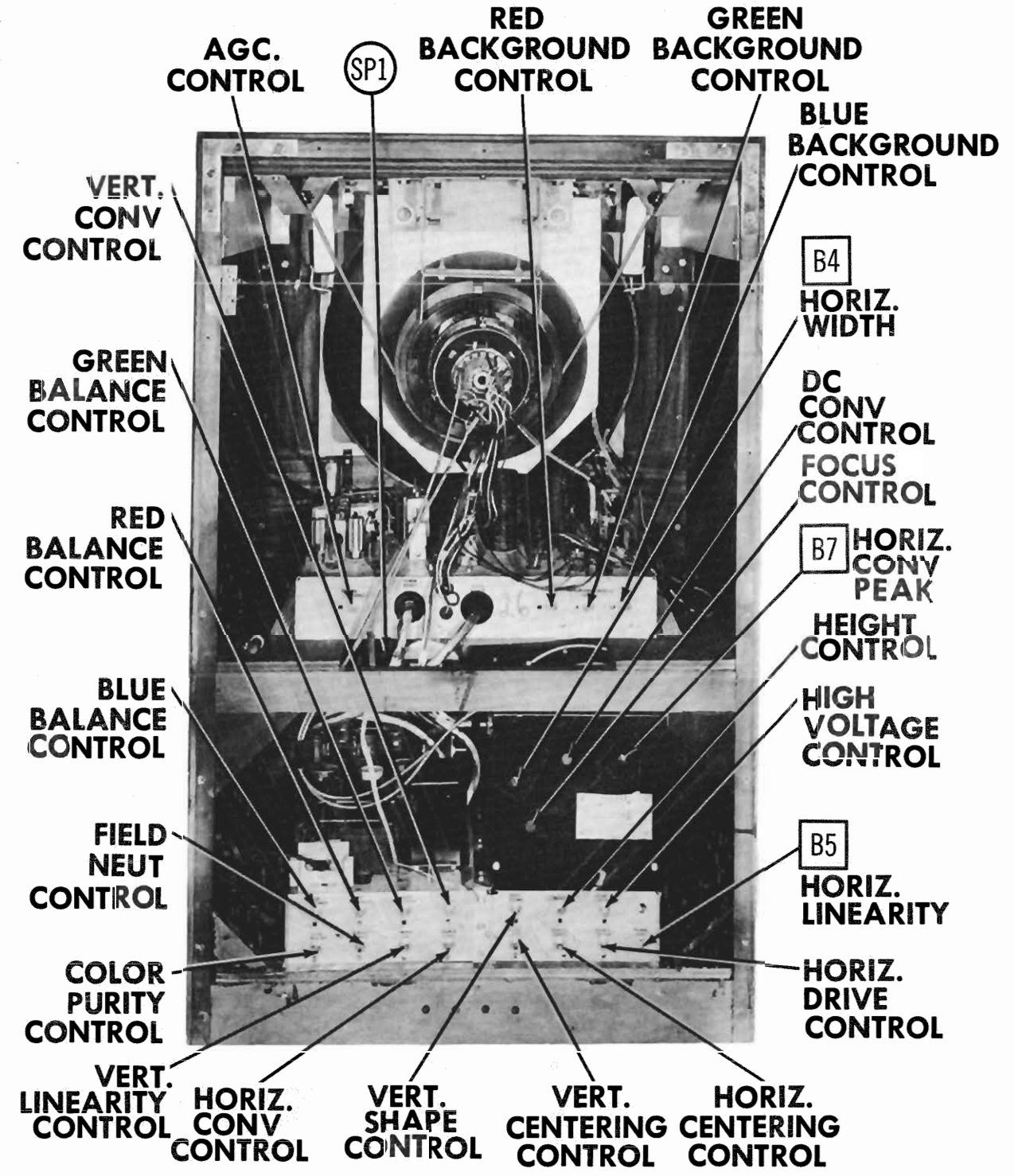
SPARTON MODEL
16A211 (Ch. CTV-2)



PICTURE TUBE ASSEMBLY



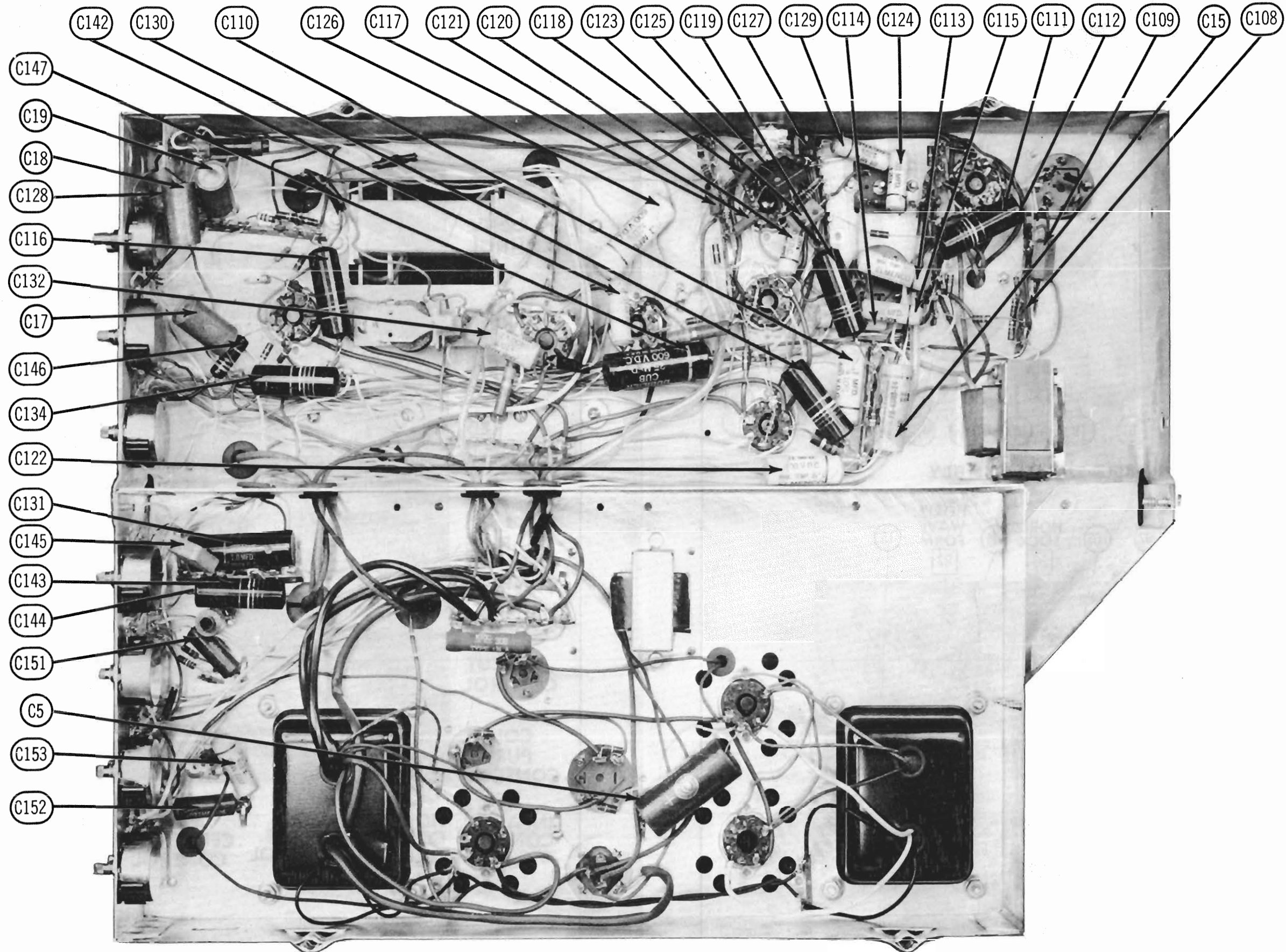
SWEEP CHASSIS BOTTOM VIEW TRANS., INDUCTOR & ALIGN. IDENT.



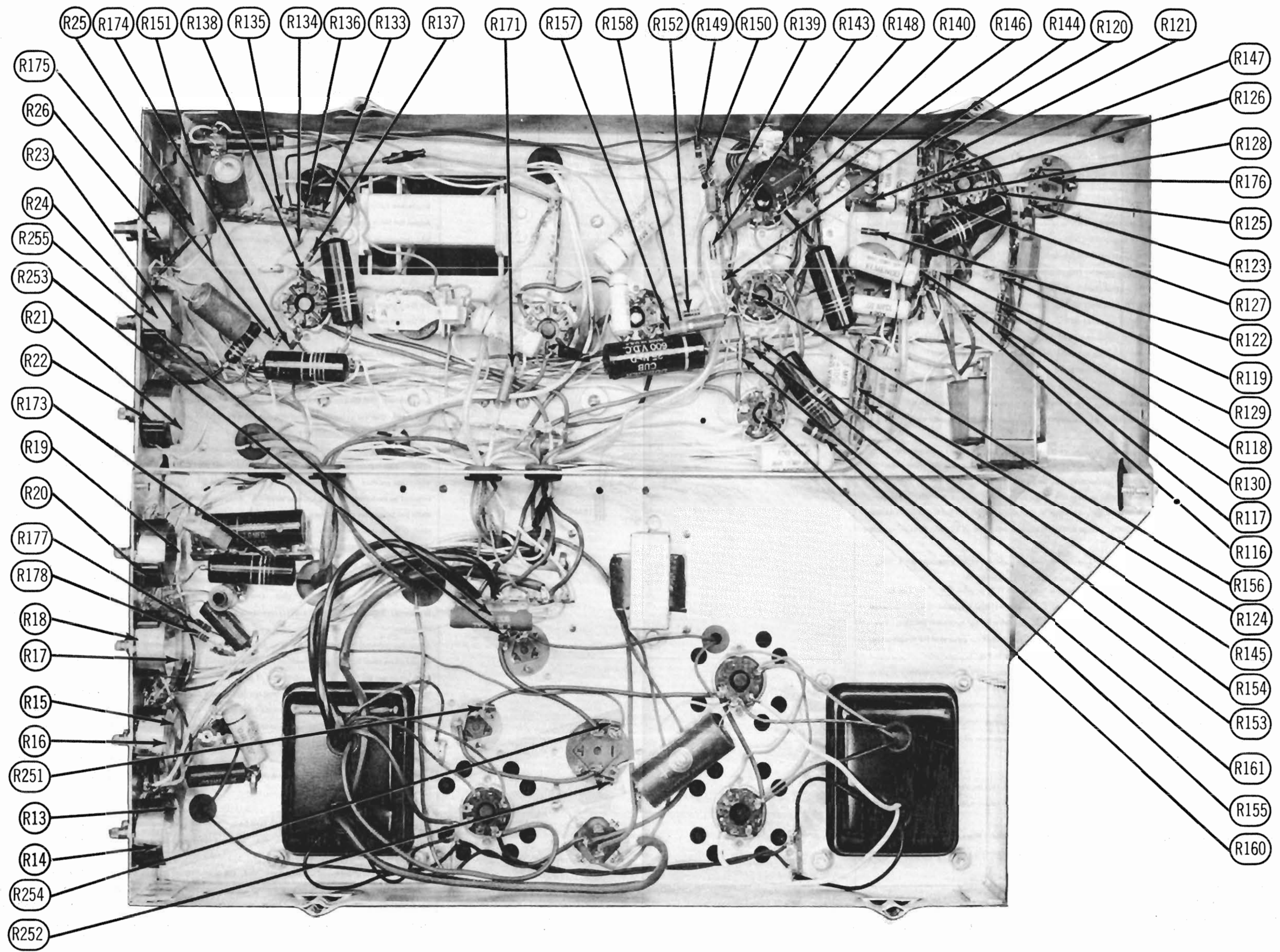
CABINET-REAR VIEW

SET 299 FOLDER 9

SPARTON MODEL
16A211 (Ch. CTV-2)



SWEEP CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



SPARTON MODEL
16A211 (Ch. CIV-2)

SWEEP CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

MISCELLANEOUS ADJUSTMENTS

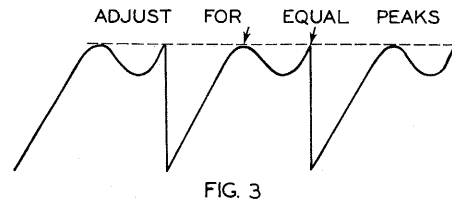


FIG. 3

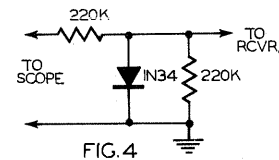


FIG. 4

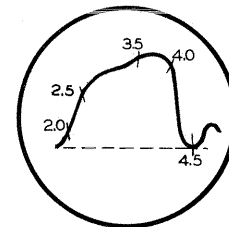


FIG. 5

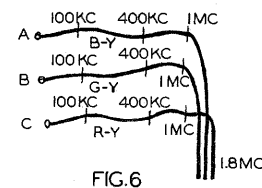


FIG. 6

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Tune in a TV station, preferably a test pattern.

If unable to synchronize the picture with the horizontal hold control (R3A), set it at its mid-range position and adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally. If unable to sync the picture horizontally continue with "Horizontal Oscillator Waveform Adjustment."

HORIZONTAL OSCILLATOR WAVEFORM ADJUSTMENT

Connect the vertical amplifier of the oscilloscope thru a 10MMF to terminal "C" of L39. Low side to chassis. Adjust the horizontal hold control (R3A) one quarter turn from its maximum clockwise position. Adjust the waveform slug (B2) until waveform similar to Fig. 3 is obtained. While making this adjustment keep the picture in sync with R3A and if necessary B1. Remove the oscilloscope from terminal "C" of L39.

HORIZONTAL LOCKING RANGE ADJUSTMENT

Set the horizontal hold control (R3A) fully counter clockwise. Picture should remain in sync. Momentarily remove signal by switching off channel and back again. If picture does not fall out of sync adjust B1 until picture falls out of sync when switching off channel and back again. Adjust R3A clockwise and note the number of diagonal bars present as picture falls into sync.

If more than three bars are present, adjust the horizontal locking range trimmer (B3) slightly clockwise. If less than 2 bars are present, adjust B3 counter clockwise. Repeat the above procedure until the correct (2 or 3) number of bars are present. Adjust R3A fully clockwise. Adjust B1 until the diagonal bars slope to the right and then readjust B1 back until the picture just falls into synchronization.

In weak signal areas the horizontal hold should be adjusted so that when switching off channel and back again the picture returns completely in sync. Adjust the horizontal drive control (R26) to eliminate any compression or a white vertical line near center of the screen.

Adjust the horizontal width coil (B4) for a picture slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity coil (B5) for a picture that is symmetrical from left to right.

COLOR CIRCUIT ALIGNMENT

Connect a NTSC color bar signal generator to the receiver antenna terminals. Set the tuner, color saturation control and the color phase trimmer for color bars on the screen. Set the color hold control (R5) at its mid-range position. Adjust A28 until the color bars on the screen are synchronized.

Connect the RF probe of a VTVM to point Ⓢ. Common side to point Ⓢ. Remove V6 from its socket and disconnect color bar generator from antenna terminals. Set the color saturation control for minimum. Adjust A29 for maximum deflection. If two peaks occur when adjusting A29 use the one with slug nearest the chassis. Adjust A30 for minimum reading on VTVM.

Set the color phase trimmer, color saturation control and color hold control at their mid-range positions. Connect a 5000MMF capacitor from pin 5 of V35 to pin 3 of V8A. Connect the RF probe of VTVM to point Ⓢ. Common to point Ⓢ. Adjust A31 for minimum deflection on VTVM. Move the RF probe of VTVM to pin 1 (Cathode) of 6AL5 (V33). Adjust A32 for maximum deflection on VTVM. Remove capacitor from pin 5 of V35 and pin 3 of V8A.

Connect the high side of a RF signal generator thru a .1MFD to pin 3 of V8A. Low side to point Ⓢ. Adjust signal generator for 4.5MC.

Connect the RF probe of VTVM to point Ⓢ. Common to point Ⓢ. Adjust A33 for minimum deflection on VTVM. Remove 12AT7 (V34) from its socket. Replace V6 in its socket. Connect sweep generator thru a .015 MFD to point Ⓢ. Low side to chassis. Couple marker generator loosely to sweep generator thru a 2-5MFD capacitor. Connect the vertical amplifier of an oscilloscope thru a detector (Fig. 4) to point Ⓢ. Low side to chassis. Adjust the contrast and color saturation control for maximum position. Use enough sweep generator output for useable pattern on scope. Set sweep generator for 0-5MC sweep and marker generator for frequencies of 2.0MC, 2.5MC, 3.5MC, 4.0MC, and 4.5MC. Adjust A34, A35 and A36 for response curve similar to Fig. 5.

Set the demodulator gain control (R10) at its mid-range position. Connect the high side of sweep generator thru a .1MFD capacitor to point Ⓢ. Low side to chassis. Connect the vertical amplifier of scope thru probe (Fig. 4) to pin 18 (grid) of V44. Low side to chassis. Loosely couple marker generator to sweep generator output. Sweep from 0-2MC. Adjust A37 and A38 for response similar to Fig. 6A. Move scope connection to pin 3 (grid) of V44. Adjust A39 and A40 for response similar to Fig. 6B. Connect scope to pin 8 (grid) of V44. Adjust A41 and if necessary, slightly retouch A40 for response similar to Fig. 6C. Repeat adjustments A37 thru A41 until satisfactory response curves similar to Fig. 6A, 6B and 6C are obtained. Replace V34 in its socket.

R-Y-B-Y BALANCE ADJUSTMENTS

Connect a color signal generator, providing ±R-Y and ±B-Y signals across the antenna terminals. Connect the vertical amplifier of the oscilloscope to pin 5 (cathode) of 6AL5 (V30B). Connect low side to chassis. Adjust the color phase trimmer control for zero B-Y signal indication on scope.

Move the scope connection to pin 5 cathode of (V40B). Adjust A30 for zero R-Y signal indication on scope. Move scope back to pin 5 of V30B and recheck zero indication of B-Y signal on scope. Repeat adjustments of color phase trimmer control and A30 until proper balance of R-Y and B-Y are obtained.

AGC THRESHOLD CONTROL ADJUSTMENT

Tune in a TV station with a test pattern. Connect the vertical input lead of an oscilloscope thru a 10KΩ to point Ⓢ. Low side to point Ⓢ. Adjust the AGC threshold control (R6) to obtain 3.5 volts peak to peak on oscilloscope.

RECEIVER SET-UP ADJUSTMENTS

Set contrast control (R2) fully counter clockwise. Set the master brightness control (R4A) fully counter clockwise.

Set the color saturation control switch (R4B, C) to off position.

Set the high voltage control (R25) at its mid-range position.

Set the red (R7), green (R8), and blue (R9) background controls to their minimum position.

Set the horizontal convergence control (R20), vertical convergence control (R19), color purity control (R14), the green balance control (R17) and the blue balance control (R13) at their minimum positions.

Set the red balance control (R15) and the field neutralizing control R16 at their mid-range positions.

Turn off receiver and connect the probe end of a high voltage probe through a short length of high voltage anode lead to the plate of the high voltage regulator tube (6BD4/V29). Slightly raise the cap on top of the tube to make this connection. Turn the set on, adjust the master brightness control (R4A) and the green background control (R8) for brightness on the screen of picture tube.

Adjust the focus control (R12) for best focus in the center portion of the screen. Adjust the high voltage control (R25) for 20KV. Turn R4A throughout its range, if more than a slight voltage change occurs, slightly readjust R25.

COLOR PURITY ADJUSTMENT

Set the channel selector switch between any two channels.

For pre-setting of controls refer to "Receiver Set-up Adjustments".

Set the 3 beam positioning magnets located over neck of picture tube fully counter clockwise.

Set the red background control (R7) at maximum position. Adjust the master brightness control (R4A) for a bright red screen. Alternately rotate the purity coil (T9) and adjust the color purity control (R14) until red screen purity is obtained. Slide the yoke mounting to the rear as far as possible, then slide forward until maximum red screen purity is obtained. Recheck adjustments of T9 and R4 for maximum red purity. Check the blue screen purity by turning the blue background control (R9) for maximum and the red and green background controls for minimum. Check the green screen purity by tuning green background control (R8) for maximum and the red and blue background controls for minimum. Set the contrast control (R2) fully counter clockwise. Set the master brightness control (R4A) at its mid-range position.

Adjust red, blue and green background controls for a low brightness white raster.

DC CONVERGENCE ADJUSTMENTS

Connect the RF output of a white dot generator across the antenna terminals. Set tuner to correct channel. Turn the horizontal and vertical dynamic convergence controls (R19, R20) for minimum. Set the DC convergence control (R11) and the vertical convergence shape at their mid-range position. Position the convergence magnets until the red, blue and green dots of a dot triad near the center of the screen are superimposed on each other forming a single white dot. Frequent readjustment of the focus and DC convergence controls may be necessary while positioning the convergence magnets due to interaction. Final positioning of the convergence magnets should not leave them too close to the neck of the picture tube or beam focus distortion may result.

DYNAMIC CONVERGENCE ADJUSTMENTS

Leave the white dot generator connected as under "DC Convergence Adjustments".

Turn the DC convergence control and the focus control for a small triangle of dots near the center of the screen. Set the horizontal dynamic convergence control for maximum. Connect the vertical amplifier of an oscilloscope to pin 2 (plate) of 6BL7 (V20B). Low side to chassis. Adjust the horizontal convergence phase slug B6 and horizontal convergence peaking slug B7 for maximum positive peaks on scope.

Adjust the horizontal dynamic convergence control and if necessary, B6 until a horizontal line near the center of the screen show an equal displacement from left to right. Readjust the DC convergence control until the dots along this line converge to form a single line of white dots. Readjust the focus to obtain best detail of dots.

Turn the vertical convergence control so that the dots along a vertical line show equal dot displacement from top to bottom of center line.

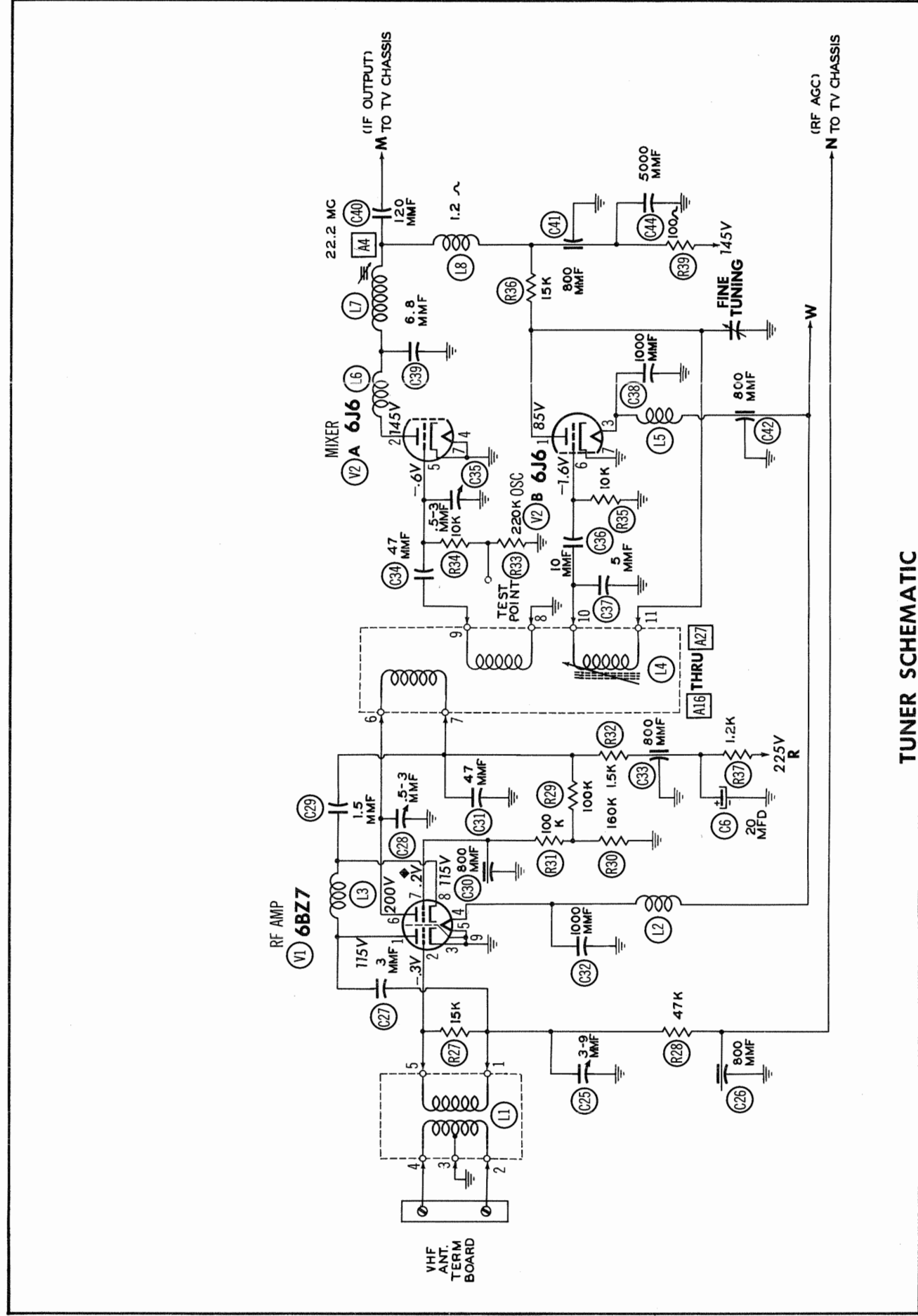
If equal dot displacement does not occur on the vertical center line adjust the vertical convergence shape control to obtain the most uniform dot displacement. If necessary, readjust the vertical convergence control. Readjust the DC convergence control so that the dots converge to form white dots along the vertical line near center of the screen. Adjust the focus control to keep dots in focus. Slight readjustment of the vertical convergence and vertical convergence shape control may be required to obtain best vertical convergence. Recheck color purity, if necessary touch up purity adjustments. (Refer to "Color Purity Adjustments") Then repeat horizontal and vertical convergence adjustments.

WHITE ADJUSTMENT

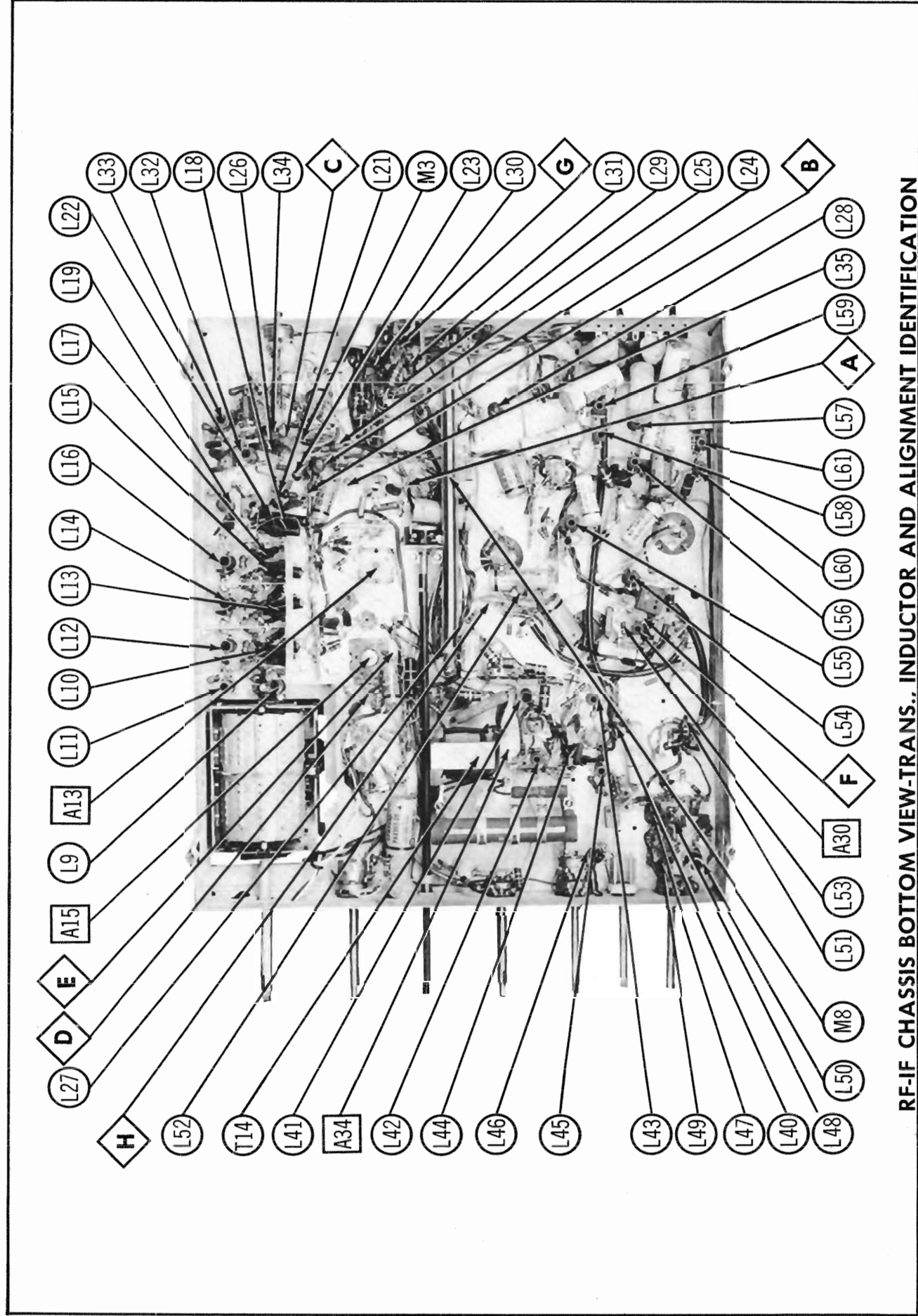
Disconnect white dot generator from antenna terminals. Turn the color saturation control to off position. Set master brightness and contrast control for best black and white screen. Tune in a black and white picture. Adjust the red, blue, and green background controls to obtain low brightness white, (grey).

Increase screen brightness and adjust the red, blue, and green balance controls until the brightness highlights in the picture are white.

Turn the brightness control for a reduced setting. Adjust red, blue, and green background and balance controls, if necessary, until the low brightness portions are white. Recheck the highlight portions and obtain best compromise of control adjustments for a black and white picture.



TUNER SCHEMATIC



RF-IF CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION
 SPARTON MODEL
 16A211 (Ch. CIV-2)

PARTS LIST AND DESCRIPTIONS
TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA			RETM A BASE TYPE	NOTES
		SPARTON PART No.	STANDARD REPLACEMENT	RETM A BASE TYPE		
V1	RF Amplifier	6BZ7	6BZ7	9AJ	6BQ7 used as alternate	
V2	Osc. - Mixer	6J6	6J6	7BF		
V3	1st. Video IF Amp.	6CB6	6CB6	7CM		
V4	2nd. Video IF Amp.	6BA6	6BA6	7BK		
V5	3rd. Video IF Amp.	6BA6	6BA6	7BK		
V6	4th. Video IF Amp.	6CB6	6CB6	7CM		
V7	Video Detector - Sync Limiter	6AL5	6AL5	6BT		
V8	Video Cathode Follower - Sync Amplifier	12AU7	12AU7	9A		
V9	Video Output	6CL6	6CL6	9BV		
V10	AGC Rectifier - Sync Amplifier	12AU7	12AU7	9A		
V11	AGC Amplifier - Chroma Amp.	12AU7	12AU7	9A		
V12	1st. Sound IF Amp.	6AU6	6AU6	7BK		
V13	2nd. Sound IF Amp.	6AU6	6AU6	7BK		
V14	3rd. Sound IF Amp.	6AU6	6AU6	7BK		
V15	Ratio Det.	6AL5	6AL5	6BT		
V16	AF Amplifier - AGC Clamper	6AT6	6AT6	7BT		
V17	Audio Output	6AQ5	6AQ5	7BZ		
V18	Sync Separator - Sync Cathode Follower	12AU7	12AU7	9A		
V19	Vert. Oscillator - Vert. Output	6BL7GT	6BL7GT	8BD		
V20	Protection Amp. - Convergence Amp.	6BL7GT	6BL7GT	8BD		
V21	Horiz. AFC - Horiz. Osc.	6SN7GT	6SN7GT	8BD		
V22	Horiz. Output	6BG6G	6BG6G	5BT		
V23	Horiz. Output	6BG6G	6BG6G	5BT		
V24	Damper	6AU4GT	6AU4GT	4CG		
V25	Focus Rectifier	3A3	3A3	3C		
V26	HV Rectifier	3A3	3A3	3C		
V27	Diode Coupler	3A3	3A3	3C		
V28	HV Doubler	3A3	3A3	3C		
V29	HV Regulator	6BD4	6BD4			
V30	Burst Amp. Keying - R-Y DC Restorer	6AL5	6AL5	6BT		
V31	Chroma Bandpass Amplifier	6CB6	6CB6	7CM		
V32	Burst Amplifier	6AH6	6AH6	7BK		
V33	Chroma Sync - Phase Det.	6AL5	6AL5	6BT		
V34	Chroma Ref. Osc. - Chroma Ref. Osc. Control	12AT7	12AT7	9A		
V35	Quadrature Amp.	6CB6	6CB6	7CM		
V36	R-Y Demod.	6AS6	6AS6	7CM		
V37	B-Y Demod.	6AS6	6AS6	7CM		
V38	R-Y Amp. - R-Y Matrix Amp.	12AU7	12AU7	9A		
V39	B-Y Amp. - B-Y Matrix Amp.	12AU7	12AU7	9A		
V40	G-Y DC Restorer - B-Y DC Restorer	6AL5	6AL5	6BT		
V41	LV Rectifier	5Y3GT	5Y3GT	5T		
V42	LV Rectifier	5U4G	5U4G	5T		
V43	LV Rectifier	5U4G	5U4G	5T		

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA					RETM A BASE TYPE	NOTES
	SPARTON PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.		
V44	15GP22			15GP22			

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	SPARTON PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	40	250		FP376.8	TM-404010-450	T-355	Note 1
B	40	250					
C	10	200					
C2	80	250		FP128	TM-80-250	S-155	
C3	80	250		FP128	TM-80-250	S-155	
C4A	80	250		FP227.6	TM-D80-300	D-145	
B	80	250					
C5	40	250		TC58	TD-40-250	FM-2540	
C6	20	350		TC65	TD-20-350	FM-4520	
C7	5	50		TC30	TD-5-50	MMT-0505	
C8	10	450		TC72	TD-10-450	FM-4510	
C9	500	3		WP505	TD-500-6	MTH-0650	
C10A	40	200		FP376.8	TM-404010-450	D-130	
B	40	250					
C	40	250					
C11A	40	475		FP262	TM-D40-500	D-265	
B	40	475					
C12	5	50		TC30	TD-5-50	MMT-0505	
C13A	80	450		FP368.3	TM-3057	T-715	
B	20	50			TD-25-50		
C	100	50					
C14A	10	450		FP377.4	TM-6020-450	Q-060	
B	60	450			TD-10-50		
C	10	50					
C15	2	50		TC302	TD-2-50	MMT-0505	
C16A	1000	15		WP200	TM-D1000-15	D-015	
B	1000	15					
C17	25	25		TC26	TD-25-25	FM-0225	
C18	25	25		TC26	TD-25-25	FM-0225	

Note 2

PARTS LIST AND DESCRIPTIONS (Continued)
COILS (cont)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	SPARTON PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L40	Series Peak- ing Coil	26Ω						1080 Microhenries
L41	4.5MC Trap	.7Ω			20-1004	TV-151	4652	
L42	Bandpass						1469	
L43	Grid Coil	4.2Ω			17-6011		1470	
L44	Bandpass							
L45	Plate Trans. Shunt Peak- ing Coil	8.5Ω						
L46	Burst Amp. Trans. Phase Det. Coil	10.5Ω			19-3250	TV-185	6181	
L47	Series Peak- ing Coil	4.1ΩCT						
L48	Shunt Peak- ing Coil	7Ω			19-3075		6172	
L49	Series Peak- ing Coil	2.9Ω			19-6022		4626	
L50	Shunt Peak- ing Coil	26Ω					4652	
L51	Cathode Choke	26Ω					4652	
L52	Chroma Reference Osc. Coil	4.4Ω					6110	
L53	Shunt Peak- ing Coil	4.4Ω					4652	
L54	Quadrature Trans.							
L55	B-Y Syn- chronous Detector Plate Coil	28Ω						
L56	R-Y Syn- chronous Detector Plate Coil	28Ω						
L57	G-Y Plate Series Peak- ing Coil	17Ω					4412	
L58	Shunt Peak- ing Coil	7.5Ω			19-1921		4512	
L59	R-Y Plate Series Peak- ing Coil	14Ω					4412	
L60	Shunt Peak- ing Coil	6Ω			19-1920		4409	
L61	B-Y Plate Series Peak- ing Coil	18Ω						
	Shunt Peak- ing Coil	8.5Ω						

- Parallel with 18KΩ resistor.
- ▲ Parallel with 8.2KΩ resistor.
- ◆ Use one winding only and use adaptor plate.
- ♣ Drill new mounting holes.
- † Use adaptor plate.

- ‡ Reverse coil mounting in case.
- * Disconnect 100MMF capacitor.
- †† Drill new mounting hole.
- ‡ Detune trap - Return IF.
- ‡‡ Drill new mounting hole - Parallel with 120MMF capacitor.

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 Hz)	SPARTON PART No.	Halldarson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L62	.390ADC	35Ω	3.8HY						
L63	.063ADC	114Ω	8.8HY	AB-470009-1	C5040		C-2303	26C82	C-15X

① Drill one new mounting hole.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			SPARTON PART No.	HOLDER	LITTELFUSE PART No.	HOLDER	BUSS PART No.	HOLDER
M1	3AG	5A			312005(3AG 5A)	341001	AGC5	HKP
M2	3AG P/T	250V			318.500(3AG P/T 1/2A)		GJV1/2	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		SPARTON PART No.	SYLVANIA PART No.	
M3	1N60		1N60 or 1N132	Sound Detector
M4	1N60		1N60 or 1N132	Scan protection

MISCELLANEOUS

ITEM No.	PART NAME	SPARTON PART No.	NOTES
M5	Dial Light		#47
M6	Tuner	93174	
M7	Relay		Scan protection
M8	Delay Line		Luminance channel
M9	Beam positioning Magnet		Blue beam
M10	Beam positioning Magnet		Red beam
M11	Beam positioning Magnet		Green beam
M12	Neck Shield		
B3	Trimmer Cap.	60-341	Horiz. locking range (4-70MMF) Color Phase (20-75MMF)

SPARTON MODEL
16A211 (Ch. CTV-2)

PARTS LIST AND DESCRIPTIONS (Continued)
TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA							NOTES	
		SPARTON PART No.	Haldorson PART No.	Merit PART No.	RCA TYPE No.	Ram PART No.	Stancor PART No.	Thordarson PART No.		Triad PART No.
T3	Vert. Osc. Trans.	208T9	B6701	A-4003	208T9	V402	A-8122	26A04	A-97Y	
T4	Horiz. Output Trans.	XD-2165-J			240T1					
T5	Vert. Output Trans.	XT-7898-A	Z1900 ① ②	A-3038 ①	243T1	V307 ①	A-8144 ①	26S53 ①	A-99X ①	
T6A	Yoke(45°) Horiz. (11MH)	XD-2071-J			223D1					
T7	Vert. (100MH) Horiz. Lin. Coil(12-82MH) ③									
T8	Width Coil(16-75MH)			MWC-3 ①	218R1			WC-19 ①		
T9	Purity Coil	XD-2233-C ④			224D1 ④					
T10	Field Neutralizing Coil									
T11	Horiz. Dynamic Convergence Phase Coil(6-40MH)		RF800 ⑤ ⑥	MWC-1 ⑤ ⑦	216R1	201R3A	WC-5 ⑤ ⑦	WC-13 ⑧	WC-11 ⑤ ⑦	
T12	Horiz. Dynamic Convergence Output Trans.	XT-7648-F			242T1					
T13	Vert. Dynamic Convergence Output Trans.	5XT-7610-C			241T1					

- ① Drill new mounting hole(s)
- ② Use 9 to 1 turns ratio.
- ③ Two coils, bifilar wound. Total inductance, coils connected series aiding-(4-3.3MH).
- ④ Includes beam positioning magnets & neck shield assembly.
- ⑤ Enlarge mounting hole.
- ⑥ Connect to terms #1 & #2.
- ⑦ Connect to coded red & blue terms.
- ⑧ Connect to terms #3 & #4.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE	REPLACEMENT DATA							NOTES
		SPARTON PART No.	Haldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.		
T14	6.4KΩ 3.6Ω	AB44066-3	Z1009	A-3020	A-3823	26S48	S-9Z		

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	SPARTON PART No.	QUAM PART No.	
SP1	10"	PM	3.6Ω	PC63000-41	10A31	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	SPARTON PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coils	0Ω CT	0Ω					
L2	Fl. Choke	0Ω						
L3	Neut. Coil	0Ω						
L4	RF Mixer Grid & Osc. Coils	0Ω						
L5	Fl. Choke	0Ω						
L6	RF Coil	0Ω						
L7	1st. Video IF	.9Ω						
L8	RF Choke	1.2Ω						
L9	21.75MC Trap	0Ω						
L10	Fl. Choke	0Ω			19-1003	BC-537	4608	3.8 Microhenries
L11	27.75MC Trap	0Ω						
L12	2nd. Video IF	.1Ω			20-1006			
L13	Fl. Choke	0Ω			17-1003 †	TV-102	6171A	3.8 Microhenries
L14	3rd. Video IF	.1Ω			19-1003	BC-537	4608	3.8 Microhenries
L15	Fl. Choke	0Ω			17-1003 †		6171	
L16	4th. Video IF	.1Ω			19-1003	BC-537	4608	3.8 Microhenries
L17	RF Choke	3Ω			17-1004 †		6171	
L18	Fl. Choke	0Ω			19-6022		4626	25 Microhenries
L19	21.75MC Trap	0Ω			19-1003	BC-537	4608	3.8 Microhenries
L20	5th. Video IF	.5Ω						
L21	RF Choke	2.7Ω			19-6022		4626	25 Microhenries
L22	Fl. Choke	0Ω			19-1003	BC-537	4608	3.8 Microhenries
L23	Series Peaking Coil	7.7Ω			19-3160 ■		6120 ■	146 Microhenries, wound on 18KΩ resistor
L24	Shunt Peaking Coil	17Ω			19-3660		6146	600 Microhenries
L25	Series Peaking Coil	3Ω			19-6022		4626	25 Microhenries
L26	Fl. Choke	0Ω			19-1003	BC-537	4608	3.8 Microhenries
L27	Series Peaking Coil	4.4Ω			19-7047		6110	50 Microhenries
L28	Series Peaking Coil	7.3Ω			19-3125		6153	116 Microhenries
L29	3.58MC Trap	1.8Ω			17-6011 * ■		1469	
L30	Series Peaking Coil	8.7Ω			19-3160 ▲	TV-184 ▲	6120 ▲	156 Microhenries, wound on 8.2KΩ resistor
L31	Shunt Peaking Coil	11.5Ω			19-3300		6155	300 Microhenries
L32	Sound Det. IF	.1Ω					6171A	
L33	21.75MC Trap	0Ω					6171 *	
L34	RF Choke	2.7Ω			19-6022		4626	25 Microhenries
L35	RF Coil	2.2Ω			19-1002		4606	2.7 Microhenries, IRC part #CLA
L36	1st. Sound IF	1.7Ω			6364-2	17-3495 ◆	TV-113 ◆	1470A ◆
L37	2nd. Sound IF	2Ω	2.2Ω		6667-5	17-1021 ▲	TV-113 †	6203 †
L38	Ratio Det.	4.5Ω	1.1Ω CT		6664-4	17-3493	TV-115 †	6205 †
L39	Horiz. Osc.	20Ω	50Ω		20-1402 #	TV-162 #	6183 #	Tertiary winding -.8Ω Waveform winding-46Ω

PARTS LIST AND DESCRIPTIONS (Continued)
CAPACITORS (cont)

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	SPARTON PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C19	25	25		TC26	TD-25-25	FM-0225	
C20	8	150		TC41	TD-8-150	FM-1508	
C21	30	150		TC47	TD-30-150	FM-1530	
C22	50	50		TC39	TD-50-50	FM-0550	
C23	25	25		TC26	TD-25-25	FM-0225	
C24	25	25		TC26	TD-25-25	FM-0225	

- Note 1. C1C is not used.
- Note 2. C13C is not used.

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.	SPARTON PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	
C25	3-9			829-10			
C26	800			MFT-1000			
C27	3			TCZ-3R3	NPOA-030	ZT-5533	
C28	.5-3			829-3	3115-01-0R5	CT565A	
C29	1.5			TCZ-IR5	NPOA-IR5	ZT-5515	
C30	800			MFT-1000			
C31	47			DD-470	831-470	UC-5447	
C32	1000			DD-102	801-001	DC-521	
C33	900			MFT-1000			
C34	47			DD-470	831-471	UC-5447	
C35	.5-3			829-3	3115-01-0R5	CT565A	
C36	10			TCZ-10	NPOK-100	ZT-541	
C37	5						
C38	1000			DD-102	801-001	DC-521	
C39	6.8			TCZ-6R8	NPOA-6R8	ZT-5568	
C40	120			DD-121	811-121	UC-5312	
C41	800			MFT-1000			
C42	800			MFT-1000			
C43	5000			DD-502	811-005	DC-525	
C44	5000			DD-502	811-005	DC-525	
C45	6.8			TCZ-6R8	NPOA-6R8	ZT-5568	
C46	100			TCZ-100	NPO-337-101	ZT-531	
C47	1000			D6-102	GP2L-102	UC-521	
C48	5000			DD-502	811-005	DC-525	
C49	5000			DD-502	811-005	DC-525	
C50	5000			DD-502	811-005	DC-525	
C51	5000			DD-502	811-005	DC-525	
C52	3.3			TCZ-3R3	NPOA-3R3	ZT-5533	
C53	100			TCZ-100	NPO-337-101	ZT-531	
C54	270			D6-271	GP2K-271	UC-5327	
C55	1000			D6-102	GP2L-102	UC-521	
C56	5000			DD-502	811-005	DC-525	
C57	5000			DD-502	811-005	DC-525	
C58	5000			DD-502	811-005	DC-525	
C59	270			D6-271	GP2K-271	UC-5327	
C60	1000			D6-102	GP2L-102	UC-521	
C61	5000			DD-502	811-005	DC-525	
C62	5000			DD-502	811-005	DC-525	
C63	5000			DD-502	811-005	DC-525	
C64	270			D6-271	GP2K-271	UC-5327	
C65	5000			DD-502	811-005	DC-525	
C66	5000			DD-502	811-005	DC-525	
C67	5000			DD-502	811-005	DC-525	
C68	5000			DD-502	811-005	DC-525	
C69	6.8			TCZ-6R8	NPOA-6R8	ZT-5568	
C70	5000			DD-502	811-005	DC-525	
C71	4.7			TCZ-4R7	NPOA-4R7	ZT-5547	
C72	5000			DD-502	811-005	DC-525	
C73	5000			DD-502	811-005	DC-525	
C74	.1	200		DF-104		PT401	
C75	.68	500		TCZ-68	NPO-337-680	ZT-5468	
C76	.47	200				PT4047	
C77	.047	400		DF-503		PT4147	
C78	.1	200		DF-104		PT401	
C79	470	500		D6-471	811-471	MCB245	
C80	5000			DD-502	811-005	DC-525	
C81	5000			DD-502	811-005	DC-525	
C82	5000			DD-502	811-005	DC-525	
C83	4.7			TCZ-4R7	NPOA-4R7	ZT-555	
C84	100			TCZ-100	NPO-337-101	ZT-531	
C85	47			TCZ-47	NPO-338-470	ZT-5447	
C86	10	500		TCZ-10	NPOK-100	MCE215	
C87	4.7			TCZ-4R7	NPOA-4R7	ZT-555	
C88	68	500		TCZ-68	NPO-337-680	ZT-5468	
C89	100			TCZ-100	NPO-337-101	ZT-531	
C90	5000			DD-502	811-005	DC-525	
C91	5000			DD-502	811-005	DC-525	
C92	5000			DD-502	811-005	DC-525	
C93	33	500		TCZ-33	NPOK-330	ZT-5433	
C94	5000			DD-502	811-005	DC-525	
C95	120			TCZ-121	NPO-333-121	DC-525	
C96	5000			DD-502	811-005	DC-525	
C97	1000			D6-102	GP2L-102	UC-521	
C98	.022	400		DF-203		PT4122	
C99	.033	200		DF-303		PT4133	
C100	.01	400		D6-103	GP2-333-103	PT411	
C101	.022	600		DF-203		PT4122	
C102	.0047	500		D6-472	GP2-333-472	PT4122	
C103	.68	500		D6-680	GP2-680	UC-5468	
C104	.047	4					

CAPACITORS (cont)

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	SPARTON PART No.	CENTRALAB PART No.	ERIC PART No.	MALLORY PART No.	
C113	.047	400		DF-503		PT4147	
C114	.047	400		DF-503		PT4147	
C115	.01	600		D6-103	GP2-333-103	PT611	
C116	.47	200				PT4047	
C117	.82	500		D6-820	GPIK-820		
C118	.82	500		D6-820	GPIK-820		
C119	.47	200				PT4047	
C120	.01	600		D6-103	GP2-333-103	PT611	
C121	.82	500		D6-820	GPIK-820		
C122	.1	400		DF-104		PT401	
C123	270	500		TCZ-270	NP0-335-271	MCE241	
C124	.01	600					
C125	.1	500		TCZ-12	NP0K-120		
C126	.1	600		DF-104		PT601	
C127	1200	500					
C128	.047	600		DF-503		PT4147	
C129	.01	600		D6-103	GP2-333-103	PT611	
C130	.22	400				PT4022	
C131	1.0	200				PT41	
C132	.068	400					
C133	.5	400				PT405	
C134	.082	600					
C135	.022	600		DF-203	817-02	PT6122	
C136	250	2000					
C137	1200	15000					
C138	10000	5000					
C139	1200	15000					
C140	1200	15000					
C141	2000	30000					
C142	.01	600		D6-103	GP2-333-103	PT611	
C143	.22	400				PT4022	
C144	.0033	400		D6-332	GP2-333-332	PT6233	
C145	4700	500				MCEB45	
C146	.0033	400		D6-332	GP2-333-332	PT6233	
C147	.25	600				PT6025	
C148	1000	10000					
C149	1000	10000					
C150	500	20000					
C151	.022	600		TV3-502	413	HV20035A	
C152	.022	600		DF-203	817-02	PT6122	
C153	.022	600		DF-203	817-02	PT6122	
C154	100000			DD-103	811-01	DC-511	
C155	180	500		TCZ-180	NP0-334-181	MCEB237	
C156	100	500		TCZ-100	NP0-337-101	ZT-531	
C157	.047	400		DF-503		PT4147	
C158	3-12	500		822-FZ	TS2A-3	ST-553-Z	
C159	300	500		TCZ-300	NP0-335-301	MCEB241	
C160	5000			DD-502	811-005	DC-525	
C161	5000			DD-502	811-005	DC-525	
C162	10000			DD-103	811-01	DC-511	
C163	1000			D6-102	GP2L-102	UC-521	
C164	5000			DD-502	811-005	DC-525	
C165	47			TCZ-47	NP0-338-470	ZT-5447	
C166	5000			DD-502	811-005	DC-525	
C167	.15	200		DD-103	811-01	DC-511	
C168	10000			DD-103	811-01	DC-511	
C169	100			TCZ-100	NP0-337-101	ZT-531	
C170	33	500		TCZ-33	NP0L-330	ZT-5433	
C171	2200			D6-222	GP2-333-222	UC-5222	
C172	2200			D6-222	GP2-333-222	UC-5222	
C173	100			TCZ-100	NP0-337-101	ZT-531	
C174	5000			DD-502	811-005	DC-525	
C175	2.2			TCZ-2R2	NP0A-2R2		
C176	10000			DD-103	811-01	DC-511	
C177	2400	500				MCEB460	
C178	10000			DD-103	811-01	DC-511	
C179	47			TCA-47	N330L-470		
C180	300	500		TCZ-300	NP0-335-301	MCE241	
C181	300	500		TCZ-300	NP0-335-301	MCE241	
C182	33			TCZ-33	NP0L-330	ZT-5433	
C183	1-12	500				MCE240	
C184	220			DD-502	811-005	DC-525	
C185	5000			DD-502	811-005	DC-525	
C186	5000			DD-502	811-005	DC-525	
C187	1500	500				MCE256	
C188	240	500		TCZ-240	NP0-335-241	MCE240	
C189	180	500		TCZ-180	NP0-334-181	MCE237	
C190	4.5-25			822-AZ			
C191	.1	200		DF-104		PT401	
C192	1000			D6-102	GP2L-102	UC-521	
C193	5000			DD-502	811-005	DC-525	
C194	10000			DD-103	811-01	DC-511	
C195	.1	400		DF-104		PT401	
C196	5000			DD-502	811-005	DC-525	
C197	5000			DD-502	811-005	DC-525	
C198	.1	400		DF-104		PT401	
C199	.22	200				PT4022	
C200	.22	200				PT4022	
C201	.47	200				PT4047	
C202	.47	200				PT4047	
C203	.47	200				PT4047	
C204	.47	200				PT4047	
C205	.47	200				PT4047	
C206	.47	200				PT4047	

Note 3. Not used in some versions.

PARTS LIST AND DESCRIPTIONS (Continued)
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	SPARTON PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	1Meg		PA4450-6	QJ-810†		F1-55	UF16L	Tone (Panel)
B	330KΩ					R2-38	UR354-T74	Volume (Rear) Attach to R1A. Tapped at 68K.
C	Switch					KB-1	US-26	Attach to R1B.
R2A	1000Ω	2	PA4453	WK-1000	A43-4000	V-129	R1000L	Contrast (Wire Wound)
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	DS-36	Attach to R2A.
R3A	50KΩ		PA4456-1	*QJ-431	RTV-504	F1-29	UF94L	Horizontal Hold (Panel)
B	1Meg					R2-51	UR16L	Vertical Hold (Rear). Attach to R3A.
R4A	50KΩ					F1-29	UF54L	Master Brightness (Panel)
B	10KΩ					KB-23	UR14L	Color Saturation (Rear). Attach to R4A.
C	Switch					KB-1	US-26	Attach to R4B.
R5A	750Ω		CAEX13675A	Q11-103	A-47-500-S	B-4	U-2	Color Hold
B	Shaft				C-3	Not Req.		Attach to R5A.
R6A	200KΩ			Q11-129	A47-200K-S	AB-46	U-43	AGC Threshold
B	Shaft				FKS-1/A	AK-1	Not Req.	Attach to R6A.
R7A	1Meg		PA4443	Q11-137	A47-1Meg-S	B-69	U-54	Red Background
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R7A.
R8A	1Meg		PA4443	Q11-137	A47-1Meg-S	B-69	U-54	Green Background
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R8A.
R9A	1Meg		PA4443	Q11-137	A47-1Meg-S	B-69	U-54	Blue Background
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R9A.
R10A	1000Ω		PA4434	Q11-108	A47-1000-S	AB-5	SU-6	Demodulator Gain
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R10A.
R11	15Meg					RQ		D. C. Convergence Focus
R12	5Meg					Q11-141	AB-87	Blue Balance
R13A	5Meg			Q11-141	A47-5Meg-S	AK-1	Not Req.	Attach to R13A.
B	Shaft			RQ	FKS-1/4	AK-1	R30L	Color Purity (Wire Wound)
R14A	30Ω	2		W-30	A43-30	VK-112	Not Req.	Attach to R14A.
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	
R15A	5Meg			Q11-141	A47-5Meg-S	AB-87	SU-6†	Red Balance
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R15A.
R16	30Ω	2		W30X15	RTV-15	SVT-902	R30-CT	Field Neutralizing (Wire Wound)
R17A	5Meg			Q11-141	A47-5Meg-S	AB-87	SU-6†	Center Tapped
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Green Balance
R18A	5000Ω	2	PA4411	WK-5000	A43-5000	VK-135	R5000L	Vertical Linearity (Wire Wound)
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R18A.
R19A	10KΩ			Q11-116	A47-10K-S	B-14	U-20	Vertical Convergence
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R19A.
R20A	100Ω	2		A43-100	W-100	VK-121	R100L	Horizontal Convergence (Wire Wound)
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R20A.
R21A	5Meg			Q11-141	A47-5Meg-S	AB-87	SU-6†	Vertical Convergence Shape
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R21A.
R22	20Ω	2		W20X10	RTV-98	SVT-901	R20-CT	Vert. Centering (wire wound) CT
R23A	1Meg		PA4443	Q11-137	A47-1Meg-S	B-69	U-54	Height
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R23A.
R24	50Ω	2	PA4443-2	Q11-137	A47-1Meg-S	B-69	U-54	Horiz. Centering (wire wound) CT
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R24A.
R25A	100KΩ		CAEX13661	A47-100K-S	RS-2	AK-1	Not Req.	Horizontal Drive
B	Shaft							Attach to R25A.

*CONCENTRIKIT EQUIVALENT: K-2 KIT, BASE ELEMENTS & SHAFTS: B11-123, P2-226, (Panel) B11-137, R1-308 (Rear)

†Universal Replacement (Mallory Exact Duplicate Part No. UE1029)

‡CONCENTRIKIT EQUIVALENT: K-2 KIT, BASE ELEMENTS AND SHAFTS: B11-137, P1-226 (Panel) B11-137X, R1-308 (Rear) 76-2 (Switch)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SPARTON PART No.	IRC PART No.	
R69	15KΩ				BTS-1000 5%
R70	100KΩ	2			BTS-1000 5%
R71	100KΩ	2			BTS-1000 5%
R72	5600Ω	2			BTS-5600 5%
R73	6800Ω	2			BTS-6800 5%
R74	5600Ω	2			BTS-5600 5%
R75	100KΩ	2			BTS-1000 5%
R76	270Ω				BTS-2700 5%
R77	330KΩ	2			BTS-330K 5%
R78	5600Ω	2			BTS-5600 5%
R79	22KΩ	5%			BTS-22K 5%
R80	330KΩ	5%			BTS-330