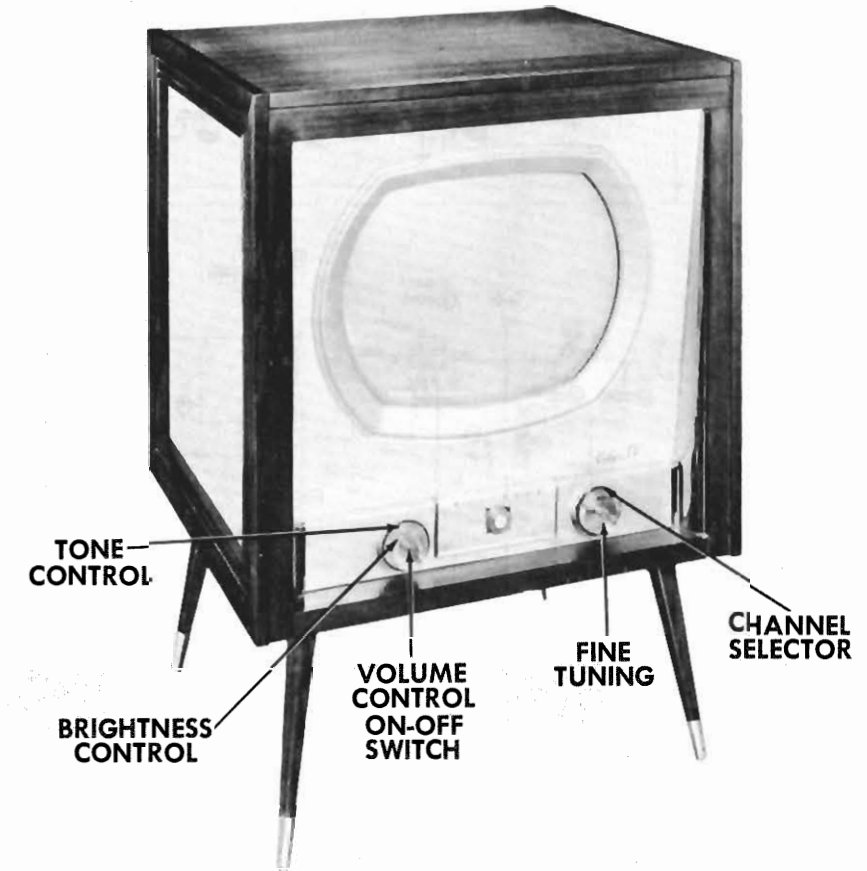


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**MOTOROLA MODELS 19CK1, B, 19CK2, B, 19CT1, B (Ch. TS-902A-03, -04 & Ch. BP-902A-01), Y19CK1, B, Y19CK2, B, Y19CT1, B (Ch. TS-902AY-03, -04, & Ch. BP-902A-01)**



**MOTOROLA MODELS 19CK1, B, 19CK2, B, 19CT1, B (Ch. TS-902A-03, -04 & Ch. BP-902A-01), Y19CK1, B, Y19CK2, B, Y19CT1, B (Ch. TS-902AY-03, -04, & Ch. BP-902A-01)**

MOTOROLA MODEL 19CT1 (Ch. TS-902A-04 & BP-902A-01)

TRADE NAME	Motorola	MODELS	CHASSIS
		19CK1, B, 19CK2, B, 19CT1, B.....	TS-902A-03 or -04 & BP-902A-01
		Y19CK1, B, Y19CK2, B, Y19CT1, B.....	TS-902AY-03 or -04 & BP-902A-01
MANUFACTURER	Motorola Inc., 4545 Augusta Blvd., Chicago, Ill.		
TYPE SET	Color Television Receiver		
TUBES	Thirty-one		
POWER SUPPLY	110-120 Volts AC - 60 Cycles		RATING 3 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

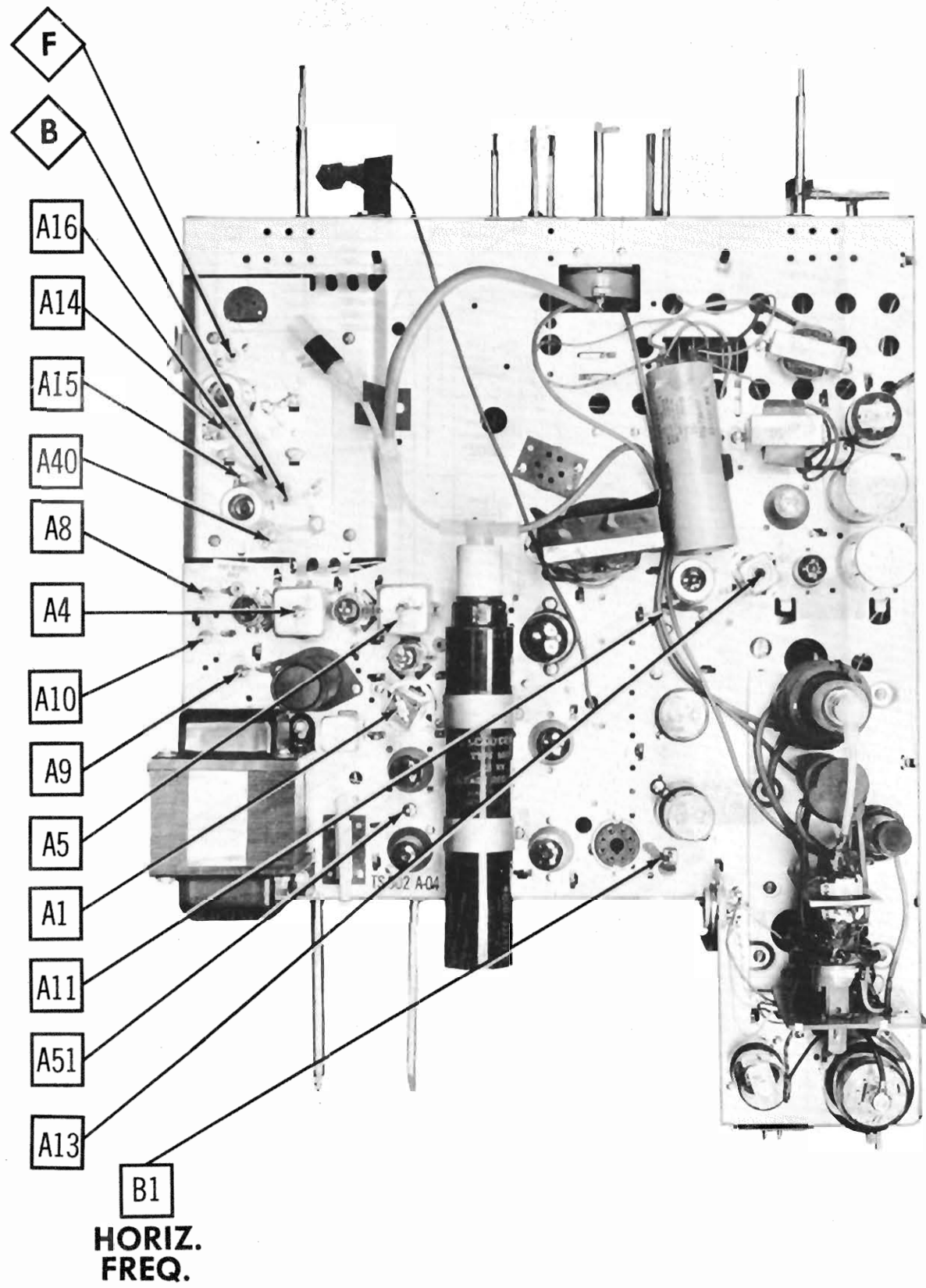
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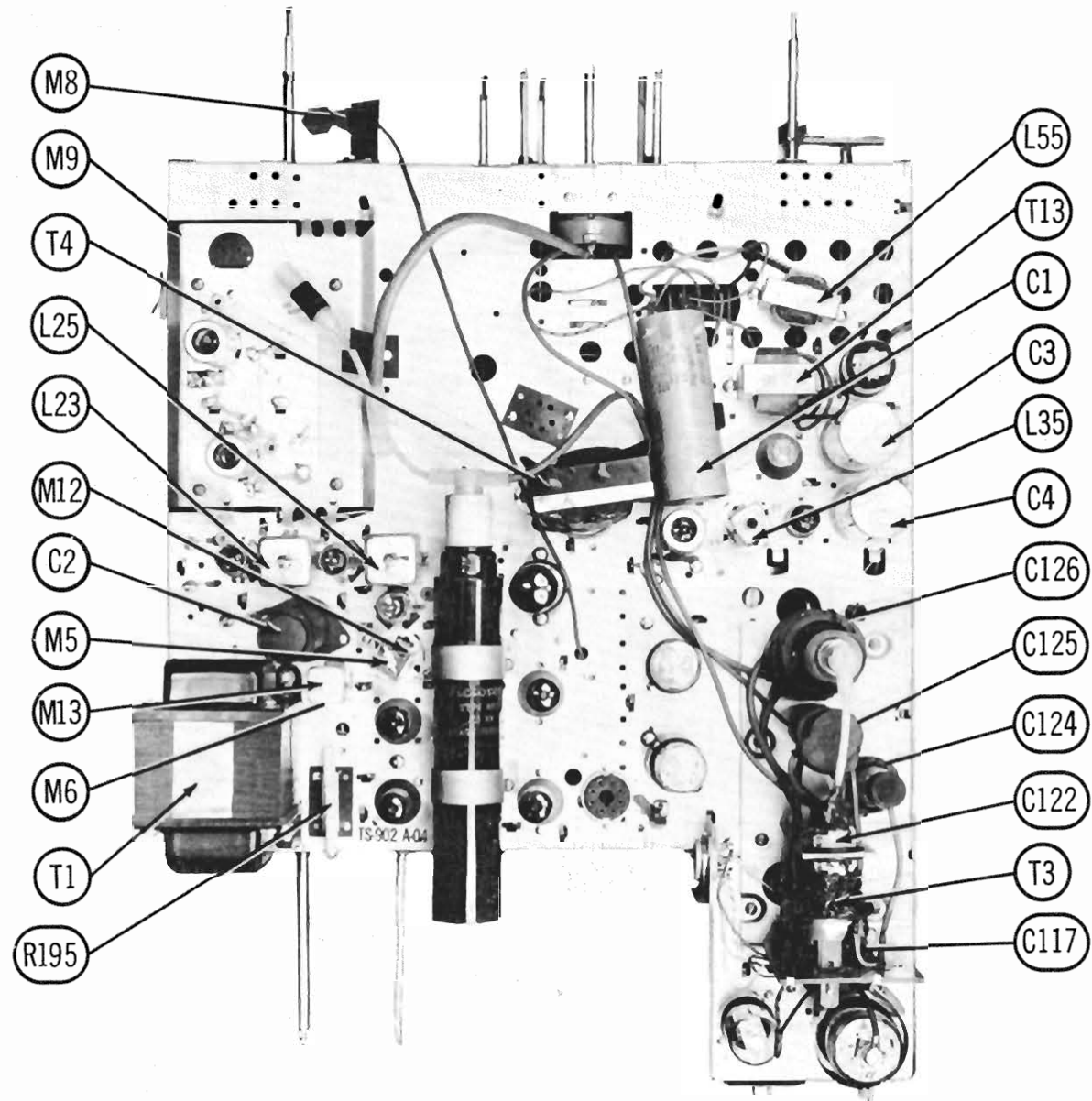
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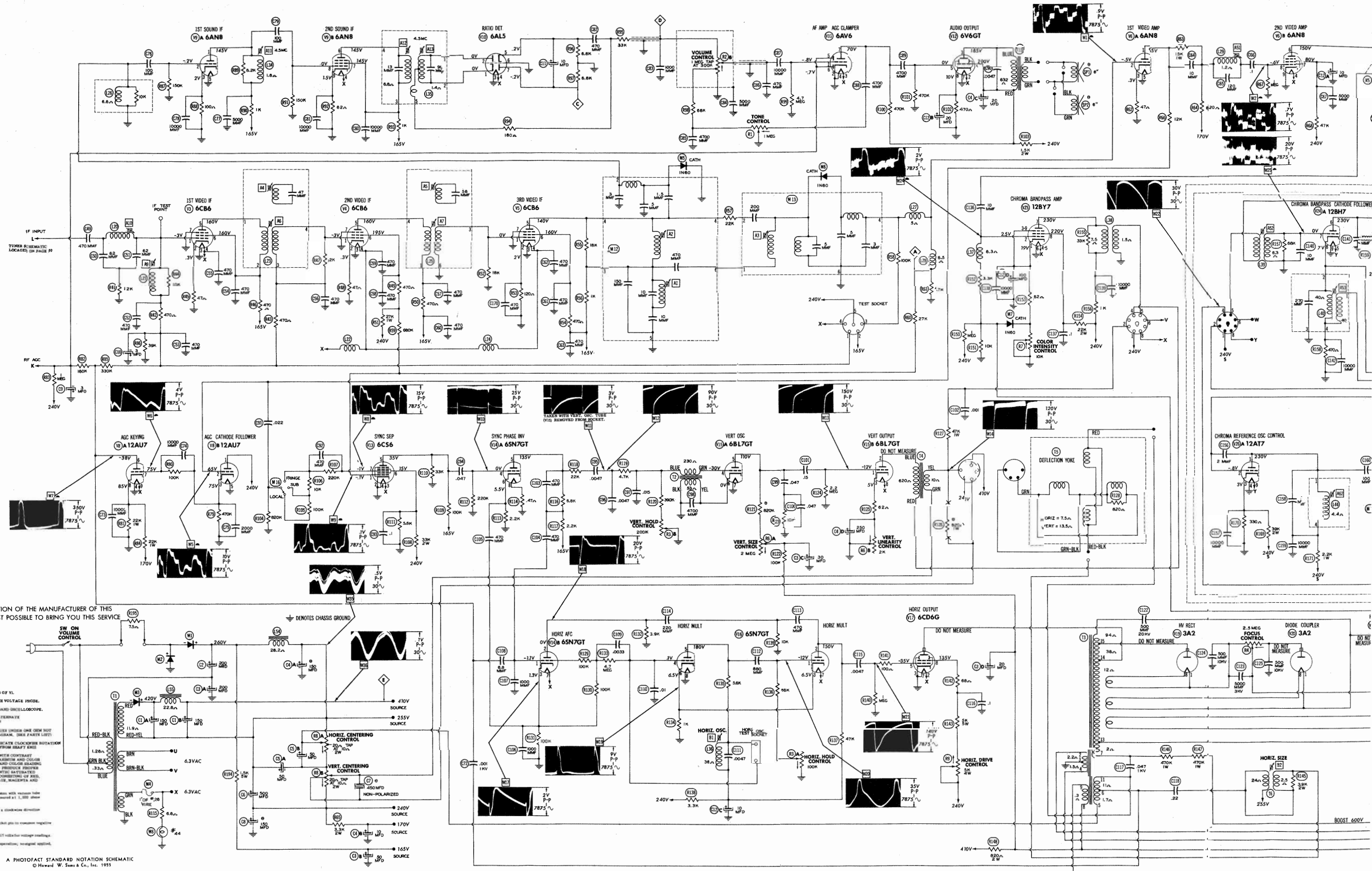
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CHASSIS TOP VIEW ALIGNMENT IDENTIFICATION



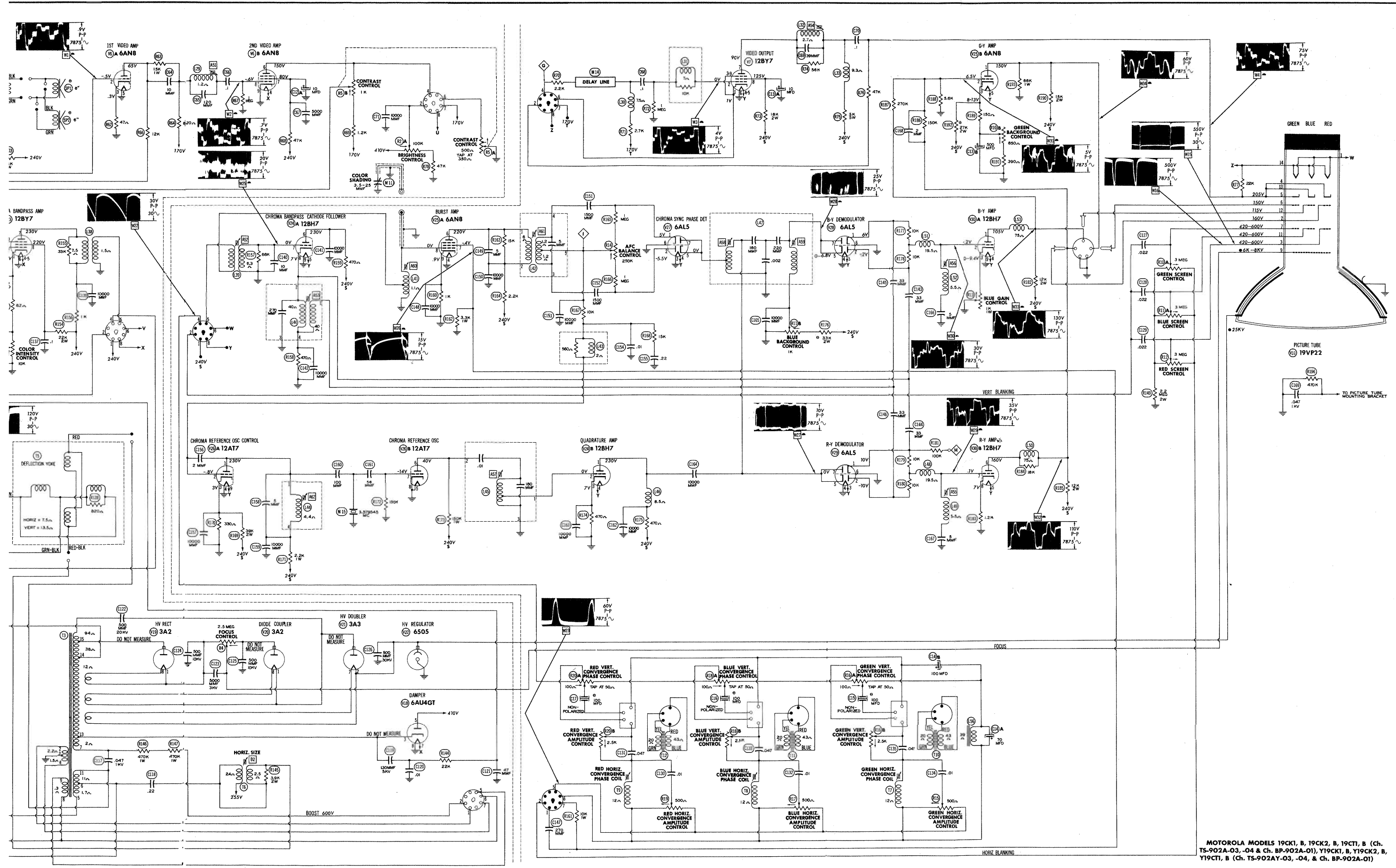
CHASSIS TOP VIEW TRANS. AND INDUCTOR IDENTIFICATION



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

- MEASURED FROM PIN 3 OF V1.
- MEASURED WITH A HIGH VOLTAGE PROBE.
- ▲ TAKEN WITH A WIDE BAND OSCILLOSCOPE.
- ◆ TAKEN WITH A VERT. OSC. TUBE (V12) REMOVED FROM SOCKET.
- SEE PARTS LIST FOR ALTERNATE VALUES 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 SHAFY END).
- ALL WAVEFORMS TAKEN WITH CONTRAST CONTROL, BIAS SET AT MAXIMUM AND COLOR INTENSITY CONTROL SET TO MINIMUM POSITION. PRESENTATION FROM AN NTSC BROADCAST. COLOR-BAR GENERATOR CONSISTS OF RED, YELLOW, GREEN, CYAN, BLUE, MAGENTA AND WHITE BARS.
- DC voltage measurements taken with vacuum tube removed; AC voltage measured at 1,000 ohm per volt.
- Pin numbers are omitted in a clockwise direction on bottom of socket.
- Measured values are from actual pins to common negative unless otherwise noted.
- Low voltage measured at 100 millivolt impedance.
- All voltages are for normal operation, average signal.

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MOTOROLA MODELS 19CK1, B, 19CK2, B, 19CT1, B  
 Ch. TS-902A-03, -04 & Ch. BP-902A-01, Y19CK1, B, Y19CK2, B,  
 Y19CK2, B, Y19CT1, B (Ch. TS-902AY-03, -04 & Ch. BP-902A-01)

MOTOROLA MODELS 19CK1, B, 19CK2, B, 19CT1, B (Ch. TS-902A-03, -04 & Ch. BP-902A-01), Y19CK1, B, Y19CK2, B, Y19CT1, B (Ch. TS-902AY-03, -04, & Ch. BP-902A-01)

### RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BZ7	†1.9KΩ	†400KΩ	INF	0Ω	.1Ω	INF	400KΩ	0Ω	0Ω
V 2	6U8	†14KΩ	400KΩ	†270KΩ	0Ω	.1Ω	†16KΩ	0Ω	0Ω	15KΩ
V 3	6CB6	40KΩ	47Ω	0Ω	.1Ω	†2KΩ	†2KΩ	0Ω		
V 4	6CB6	40KΩ	47Ω	0Ω	.1Ω	†2KΩ	†27KΩ	0Ω		
V 5	6CB6	0Ω	120Ω	0Ω	.1Ω	†2.5KΩ	†2KΩ	0Ω		
V 6	6AN8	†19KΩ	4.7KΩ	47Ω	.1Ω	0Ω	†4.3KΩ	†47KΩ	1Meg	0Ω
V 7	12BY7	40Ω	1Meg	40Ω	.1Ω	.1Ω	0Ω	†5KΩ	†18KΩ	40Ω
V 8	12AU7	†65Ω	†30KΩ	470KΩ	0Ω	0Ω	300KΩ	550KΩ	†13KΩ	.1Ω
V 9	6AN8	†2.5KΩ	150KΩ	100Ω	.1Ω	0Ω	†2.5KΩ	†2.5KΩ	150KΩ	82Ω
V 10	6AL5	1Meg	1Meg	0Ω	.1Ω	6.8KΩ	0Ω	6.8KΩ		
V 11	6AV6	4.7Meg	0Ω	.1Ω	0Ω	350KΩ	350KΩ	†470KΩ		
V 12	6Y6GT	TP	.1Ω	†2.2KΩ	†1.5KΩ	470KΩ	TP	0Ω	470Ω	
V 13	6CS6	32KΩ	0Ω	.1Ω	0Ω	†25KΩ	†8.5KΩ	1Meg		
V 14	6SN7GT	300KΩ	3.9KΩ	100KΩ	220KΩ	†11KΩ	2.2KΩ	.3Ω	0Ω	
V 15	6BL7GT	2.2Meg	‡1.7KΩ	220Ω	500KΩ	‡1.5Meg	53Ω	0Ω	.1Ω	
V 16	6SN7GT	140KΩ	†50KΩ	1KΩ	5Meg	†9KΩ	1KΩ	.1Ω	0Ω	
V 17	6CD6G	NC	.1Ω	0Ω	NC	1Meg	NC	0Ω	†7.5KΩ	Top Cap .12Ω
V 18	6AU4GT	TP	NC	4Meg	NC	‡25Ω	TP	.1Ω	0Ω	
V 19	3A2		PINS 1-8	HAVE	INFINITE	RESISTANCE			Top Cap .50Ω	
V 20	3A2		PINS 1-8	HAVE	INFINITE	RESISTANCE			Top Cap INF	
V 21	3A3		PINS 1-8	HAVE	INFINITE	RESISTANCE			Top Cap INF	
V 22	6505		CATHODE	----	0Ω				Top Cap INF	
V 23	12BY7	4.4KΩ	13KΩ	4.4KΩ	0Ω	0Ω	.1Ω	†1KΩ	†22KΩ	4.4KΩ
V 24	12BH7	†550Ω	.4Ω	470Ω	0Ω	0Ω	†550Ω	6.3Ω	500Ω	.1Ω
V 25	6AN8	†12KΩ	5KΩ	600Ω-1KΩ	0Ω	.1Ω	†2.2KΩ	2.5KΩ	1.1Ω	1KΩ
V 26	12AT7	†2.2KΩ	INF	330Ω	0Ω	0Ω	†150KΩ	150KΩ	0Ω	.1Ω
V 27	6AL5	INF	INF	0Ω	.1Ω	.4Ω	0Ω	.4Ω		
V 28	6AL5	INF	INF	.1Ω	0Ω	8Ω-1KΩ	0Ω	8Ω-1KΩ		
V 29	6AL5	INF	INF	.1Ω	0Ω	.7Ω	0Ω	.7Ω		
V 30	12BH7	†12KΩ	INF	0Ω-1KΩ	.1Ω	.1Ω	†12KΩ	INF	1.2KΩ	0Ω
V 31	19VP22	‡120KΩ	†12KΩ	‡800KΩ	‡100KΩ	‡100KΩ	†15KΩ	‡800KΩ	1.8Meg	NC
		Pin 11	Pin 12	Pin 13	Pin 14					
		‡800KΩ - 1.8Meg	†12KΩ	‡100KΩ	‡100KΩ					

† MEASURED FROM OUTPUT OF M1.  
‡ MEASURED FROM OUTPUT OF M3.  
‡ MEASURED FROM PIN 3 OF V18.  
TP - TIE POINT  
NC - NO CONNECTION

### DISASSEMBLY INSTRUCTIONS

#### CABINET TOP REMOVAL

1. Remove 10 metal screws from rear cover. Remove cover.
2. Remove 1 wood screw. (Located on rear underside of cabinet top.)
3. Slide wood slat toward rear of set. Top may now be opened.

#### REMOVAL OF CHASSIS FROM CABINET

1. Remove 5 push-on type control knobs from front panel of cabinet.
2. Remove 3 push-on type control knobs from under front control door.
3. Remove 2 wood screws from antenna bracket.
4. Remove 1 wood screw from grounding strap. (Chassis to mask.)
5. Disconnect 2 speaker leads.
6. Remove 4 chassis mounting board bolts.
7. Remove chassis and mounting board.

#### REMOVAL OF CHASSIS FROM MOUNTING BOARD

1. Disconnect HV lead, picture tube socket and vert. deflection yoke socket from chassis. Remove 3 convergence magnet sockets.
2. Remove 1 metal screw from HV cage cover. Remove cover.
3. Remove 1 metal screw from grounding lead. (Tube mount to HV cage.)
4. Disconnect 2 horiz. deflection yoke leads.
5. Remove 4 chassis bolts. Remove chassis from mounting board.

#### REMOVAL OF VERTICAL CHASSIS FROM MAIN CHASSIS

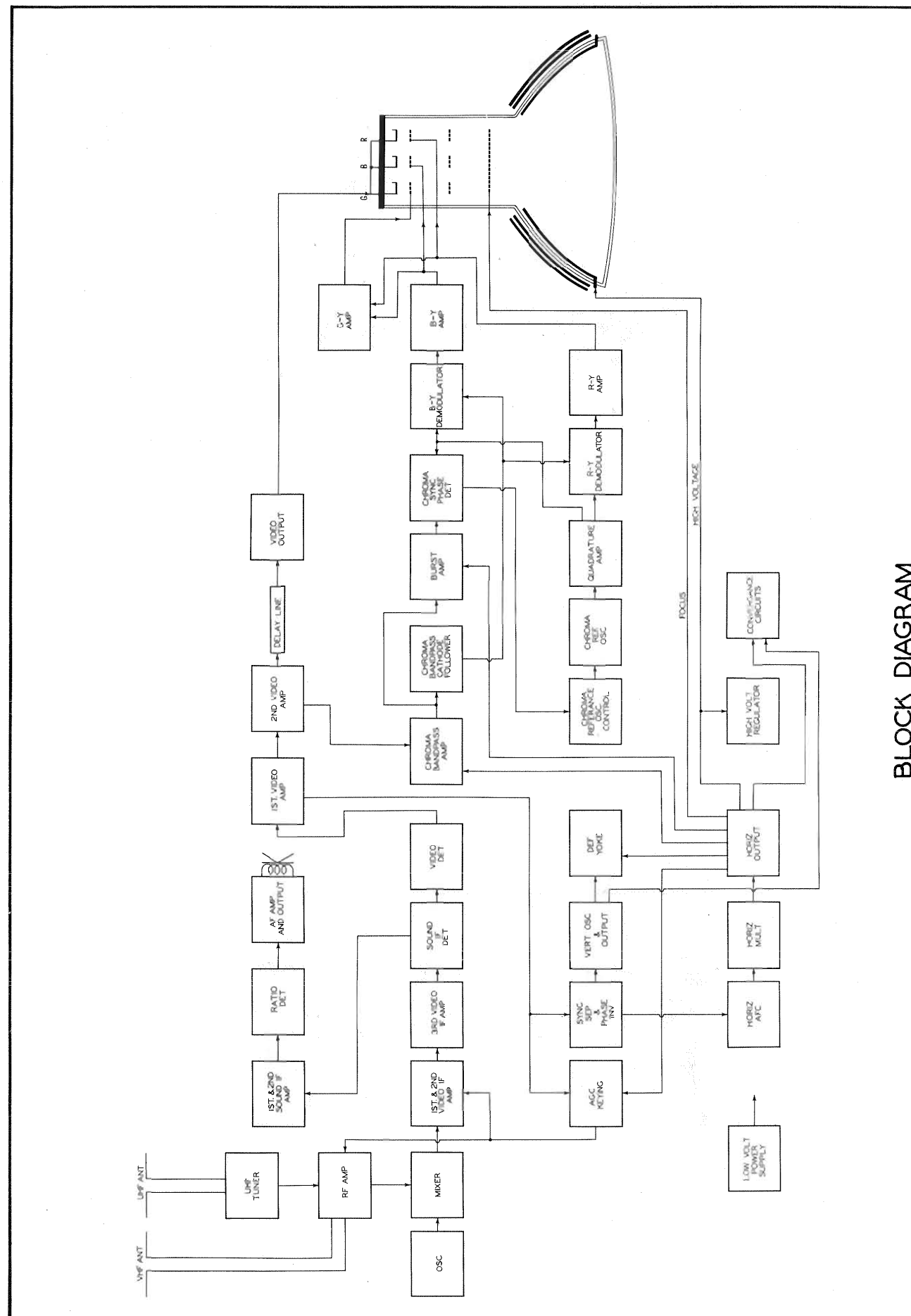
1. Remove 4 plugs from horizontal chassis.
2. Remove 1 plug from picture tube socket.
3. Remove 4 metal screws from vert. chassis.
4. Remove vert. chassis.

#### SPEAKER REMOVAL

1. Remove 8 speaker nuts.
2. Remove 2 speakers.

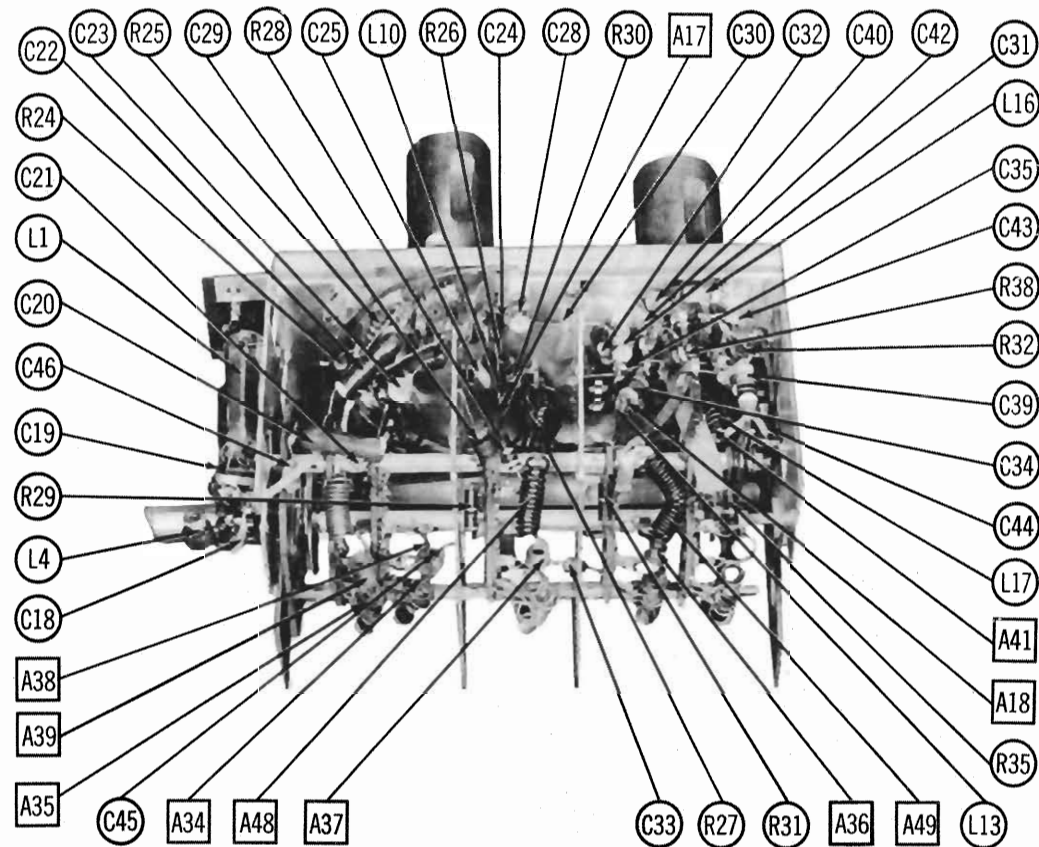
#### PICTURE TUBE REMOVAL

1. Remove chassis from cabinet.
2. Disconnect HV lead and picture tube socket.
3. Pull lever (located above magnets on yoke ass'y.) to the left (from rear of set). This will lock in position, removing pressure of magnets from tube.
4. Remove 2 magnet assemblies from neck of picture tube.
5. Remove 2 front tube mounting band bolts.
6. Remove picture tube from mounting.

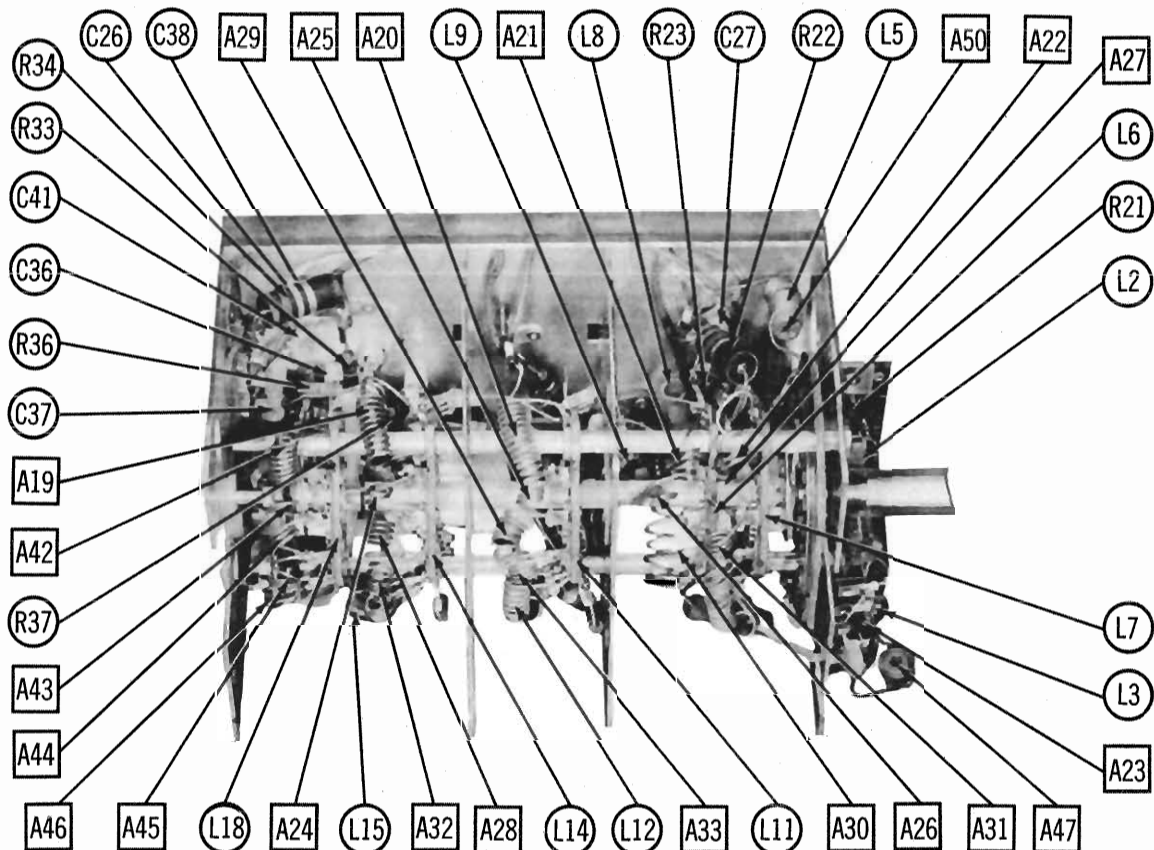


BLOCK DIAGRAM

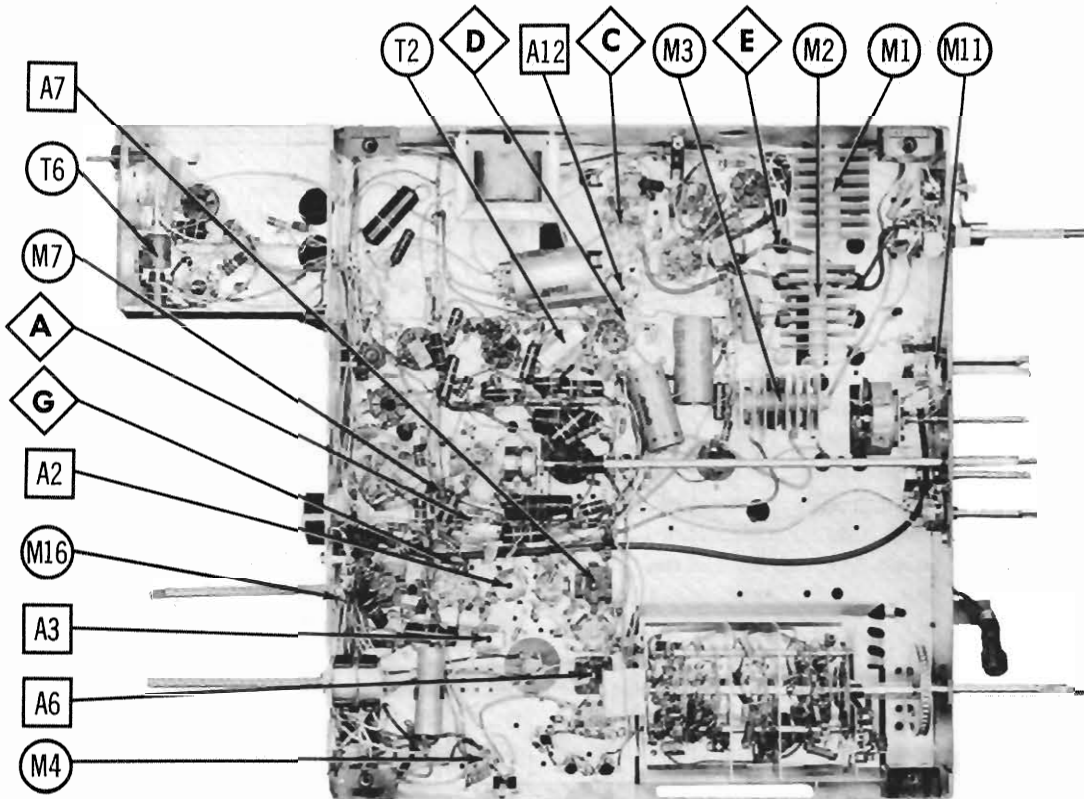
MOTOROLA MODELS 19CK1, B, 19CK2, B, 19CT1, B,  
(Ch. TS-902A-03, -04 & Ch. BP-902A-01), 19CK1, B,  
19CK2, B, 19CT1, B (Ch. TS-902A1-03, -04 & Ch. BP-902A-01)



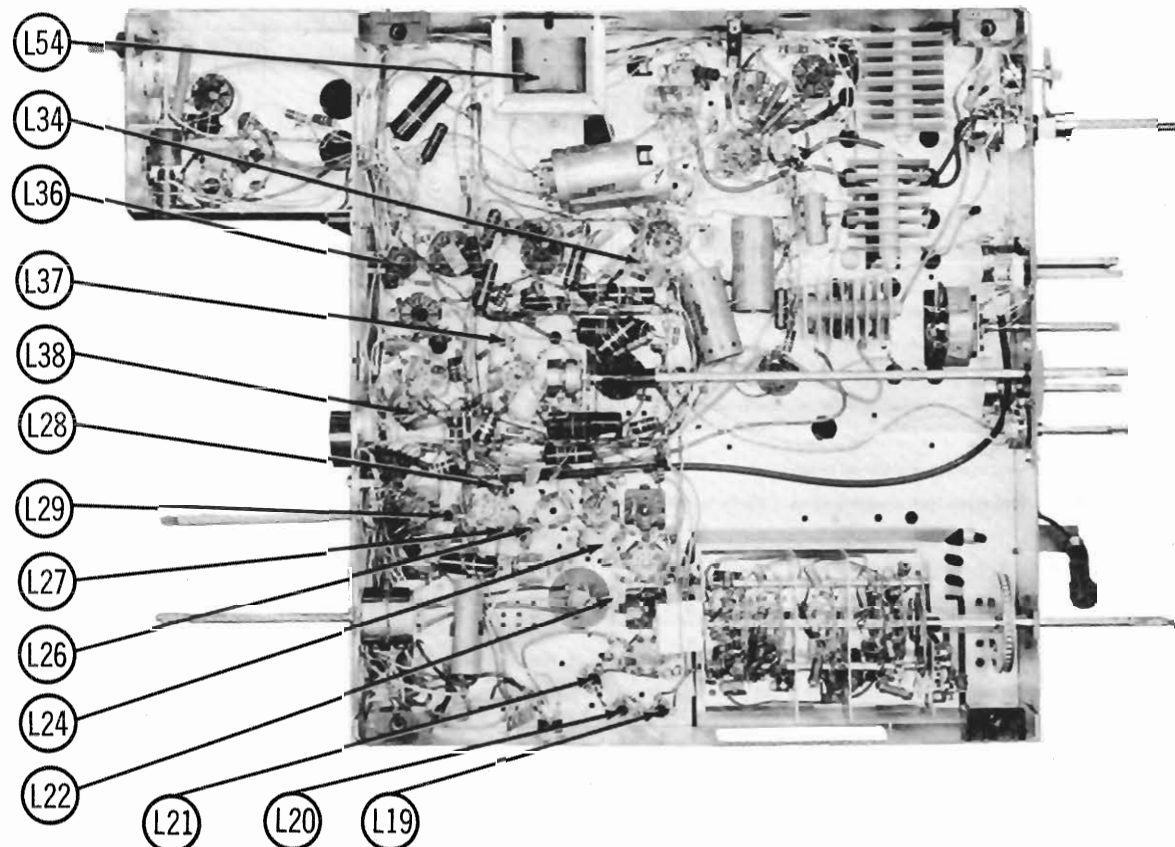
RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION



CHASSIS BOTTOM VIEW INDUCTOR IDENTIFICATION

MOTOROLA MODELS 19CK1, B, 19CK2, B, 19CT1, B  
 (Ch. 15-902A-03, -04 & Ch. BP-902A-01), Y19CK1, B,  
 Y19CK2, B, Y19CT1, B (Ch. 15-902AY-03, -04 & Ch. BP-902A-01)

## ALIGNMENT INSTRUCTIONS (cont)

### 3.58MC TRAPS IN GRID OF THE "R-Y" AND "B-Y" AMPLIFIER ALIGNMENT

Set the color intensity control (R7) fully counter clockwise.  
Replace V26 in its socket and make sure the chroma reference oscillator is operating properly.

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
31.	Use leakage signal from 3.58MC local color oscillator in set.	Not used	Not used	Any	Vert. Amp. to pin 7 (grid) of 12BH7 (V30B). Low side to chassis.	A55	Adjust for MINIMUM 3.58MC indication on scope.
32.	"	"	"	"	Vert. amp. to pin 2 (grid) of 12BH7 (V30A). Low side to chassis.	A56	"

### CHROMA REFERENCE OSCILLATOR AND BUFFER STAGE ALIGNMENT

Replace V17 in its socket. Connect yoke and picture tube. Connect a clip lead from point  $\diamond$  to chassis. Set color intensity control (R7A) and contrast control (R5A) fully counter clockwise.  
Turn coils fully counter clockwise, away from center of the coil forms.  
Connect the DC probe of a VTVM to point  $\diamond$ . Common to chassis.  
Allow set to warm up. Using the frequency of the crystal to tune the 3.58MC color oscillator tank coil and the oscillator buffer stages, adjust as outlined below.  
1. Adjust A57 for maximum deflection.  
2. Adjust A58 for maximum deflection.  
3. Adjust A59 for MINIMUM deflection.  
4. Repeat steps 1, 2 and 3 to make certain adjustments are accurate.  
5. Readjust A57 counter clockwise until a reading of approximately 25 volts is measured on VTVM. Remove short from point  $\diamond$  to chassis.

### CHROMA REFERENCE OSCILLATOR CONTROL SYSTEM ALIGNMENT

Connect DC probe of VTVM to pin 2 of 6AL5 (V27B). Common to chassis. Momentarily short pin 8 (grid) of 6AN8 (V25A) to chassis, to eliminate the unwanted incoming signals and check the injection voltage to make certain the chroma reference oscillator is working properly. The VTVM should read approximately 12 volts of injection voltage.  
Set the color shading control (M1) at its mid-range position.  
Rotate A60 and A61 fully counter clockwise, away from the center of coil. Reconnect L27 to terminal 4 of M13. Connect a 100% saturated color bar generator across antenna terminals. (A TV color signal may be used if available.)

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
33.	Direct	Use color bar generator across antenna terminals.		DC probe to pin 2 (grid) of 6AL5 (V27B). Common to chassis.	A60, A61	Adjust for maximum deflection.
34.	"	"		DC probe to point $\diamond$ . Common to chassis.	A62	Check oscillator sync, if necessary adjust A62 to bring oscillator in sync. With oscillator in sync VTVM should read 0 volts at point $\diamond$ .

35. Decrease color bar generator output until the chrominance signal is just visible on picture tube screen. If picture loses sync adjust AFC balance control (R14) until 3.58MC oscillator synchronizes. Reset output for normal chrominance signal. Connect the vertical amplifier of a scope to pin 6 (plate) of V30B., low side to chassis and readjust A60 for MINIMUM amplitude on scope.

### "R-Y" AND "B-Y" BALANCE ADJUSTMENTS

Connect a color signal generator, providing  $\pm$ R-Y and  $\pm$ B-Y signals, across antenna terminals. Connect the vertical amplifier of the oscilloscope to pin 2 (grid) of picture tube. Connect low side to chassis.  
Set the color shading control (M1) at its mid-range position. Adjust A58 for zero B-Y signal indication on scope. Move the scope to pin 12 (grid) of picture tube. Connect low side to chassis. Adjust A59 for zero R-Y signal indication on scope. Move scope back to pin 7 of V30A and recheck for zero indication of B-Y signal on scope.

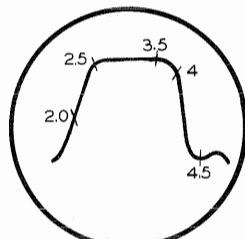


FIG. 12

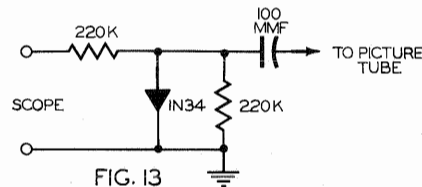


FIG. 13

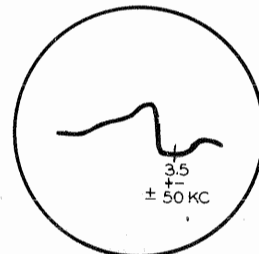


FIG. 14

## ALIGNMENT INSTRUCTIONS

### ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

AC line voltages must be maintained at 117V, if necessary, adjust with a variac.  
Use only enough signal generator output to produce useable pattern on scope.  
Remove the horizontal output tube (V17) from its socket during alignment to eliminate the high voltage shock hazard. The correct setting of cores is away from center of the coil forms.  
Allow proper time for receiver and test equipment to warm up.  
Connect a 2500 $\Omega$  25 watt resistor from point  $\diamond$  to chassis to normalize B+.  
Use an isolation transformer to protect the test equipment.

### VIDEO IF ALIGNMENT

Connect the negative lead of a 3 volt bias supply to the ungrounded side of C10. Positive lead to chassis.  
Short L13 to chassis. Hole is provided through tuner shield. This will disable the local oscillator.  
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.  
The sweep generator output lead should be terminated with its characteristic impedance usually 50 ohms.

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS	
1.	470MMF Capacitor	High side to pin 1 (grid) of 6CB6 (V5) thru 470 MMF capacitor. Low side to chassis.	43.8MC (10MC Swp)	41.25MC	Any non-interfering channel	Vert. Amp. thru a 27K $\Omega$ resistor to point $\diamond$ . Low side to chassis.	A1	Adjust A1 for MINIMUM trap dip on response curve (Fig. 1).
2.	"	"	"	45.75MC	"	"	A2	Adjust A2 to place 45.75MC marker on response curve as in Fig. 1.
3.	"	"	"	41.85MC	"	"	A3	Adjust A3 to place 41.85MC marker on response curve as in Fig. 1.
4.	"	High side to pin 1 (grid) of 6CB6 (V3) thru 470MMF. Low side to chassis.	"	47.25MC	"	"	A4	Adjust so that trap notch falls at 47.25MC (Fig. 2).
5.	"	"	"	39.75MC	"	"	A5	Adjust so that trap notch falls at 39.75MC (Fig. 2).
6.	"	"	"	45.75MC	"	"	A6	Adjust to place marker at approximately the 70% point on response curve (Fig. 2).
7.	"	"	"	41.85MC	"	"	A7	Adjust to place marker at approximately the 90% point on response curve (Fig. 2).
8.	"	High side thru 470MMF to point $\diamond$ . Low side to chassis.	"	45.75MC	"	"	A8, A9	Simultaneously adjust A8 and A9 so that the 45.75MC marker falls at the 50% point on response curve (Fig. 3) and until the 41.85MC marker falls at no less than the 90% point on response curve (Fig. 3).
9.	"	"	"	41.25MC	"	"	A10	Adjust so that trap notch falls at 41.25MC. Temporarily remove the -3 volt bias to provide better trap notch definition (Fig. 3). Recheck step 8.
10.	"	"	43.8MC (10MC Swp)	47.25MC 45.75MC 41.85MC 41.25MC	"	"		Check markers on response curve as in Fig. 3. If A8 and A9 will not place the markers within limits, slightly retouch A6 or A7 for proper marker positions on response curve (Fig. 3). Remove bias from IF AGC and attenuate sweep generator output until same level on response curve is reached as before bias removed. Band width should not change more than .2MC. Observe response curve for any regeneration. It will be indicated by sharp peak on response curve.

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

Remove V5 from its socket.

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS	
11.	Direct	High side to pin 2 (grid) of 6AN8 (V9). Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point $\diamond$ . Common to chassis.	All, A12	Adjust for maximum deflection.
12.	"	"	"	"	DC probe to point $\diamond$ . Common to chassis.	A13	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Replace V5 in its socket.

### SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Remove V5 from its socket.

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120v sawtooth voltage in scope for horizontal deflection.

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS	
11.	Direct	High side to pin 2 (grid) of 6AN8 (V9). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. thru 27K $\Omega$ to point $\diamond$ . Low side to chassis.	All, A12	Disconnect stabilizing capacitor C11. Adjust for curve of maximum amplitude and symmetry similar to Fig. 4.
12.	"	"	"	"	"	Vert. Amp. thru 27K $\Omega$ to point $\diamond$ . Low side to chassis.	A13	Reconnect stabilizing capacitor C11. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 5. SLIGHTLY retouch A12 for maximum amplitude and straightness of crossover lines. Replace V5 in its socket.

### SOUND IF ALIGNMENT USING TV SIGNAL AND VTVM

This method provides an accurate signal source.

Tune in a TV station. Connect DC probe of VTVM to point  $\diamond$ . Common to chassis. Turn fine tuning control slightly off station so that VTVM reads approximately 5 volts and adjust A11 and A12 for maximum deflection.  
Remove VTVM and adjust A13 for best program sound and minimum buzz.

MOTOROLA MODELS 19CK1, B, 19CK2, B, 19CT1, B  
(Ch. TS-902A-03, -04 & Ch. SP-902A-01), 19CK1, B,  
19CK2, B, 19CT1, B (Ch. TS-902A-03, -04 & Ch. SP-902A-01)

RF AND MIXER ALIGNMENT

Ground the tuner AGC line by grounding the ungrounded side of C9 to chassis. Set the fine tuning control to minimum capacity and remove the tuner shield. Connect a 470MMF capacitor from pin 6 of 6U8 (V2) to chassis. Remove tuner AGC short and connect bias as under "Video IF Alignment". Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13. Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	185MC (12MC Swp)	181.25MC 185.75MC	8	Vert. Amp. thru 27KΩ to point Ⓢ. Low side to chassis.	A14, A15, A16	Adjust A14, A15 and A16 so that sound and video markers fall within limits shown in Fig. 6. A14 adjusts position of curve. Adjust A15 for proper band width and A16 for correct tilt of response curve.
14. "	"	213MC (12MC Swp)	211.25MC 215.75MC	13	"	A17, A18	Adjust for response curve similar to Fig. 6. Be sure markers fall within limits shown. A18 affects tilt and A17 positions response curve. Recheck channel 8 for proper response. If necessary SLIGHTLY retouch A14, A15 and A16 for proper limits. Adjust A17 and A18 by compressing or expanding coil turns.
15. "	"	207MC (12MC Swp) 201MC (12MC Swp) 195MC (12MC Swp) 189MC (12MC Swp) 177MC (12MC Swp)	205.25MC 209.75MC 203.75MC 197.75MC 187.25MC 191.75MC 175.25MC 179.75MC	12 11 10 9 7	"	"	Check for response curve similar to Fig. 6 on all high band channels with tuner shield cover in place. With tuner shield in place markers will move up the curve a short distance but markers should be within tolerance.
16. Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	85MC (12MC Swp)	83.25MC 87.75MC	6	Vert. Amp. thru 27KΩ to point Ⓢ. Low side to chassis.	A19, A20, A21, A22	Adjust A19 thru A22 by compressing or expanding coil turns to obtain response similar to Fig. 7 with markers not falling below 80%. Adjust A19 for position of frequency markers on curve and A20 for MINIMUM tilt. Usually antenna coils need not be adjusted. If necessary, adjust A19 thru A22 to obtain maximum gain with the least tilt on response curve (Fig. 7).
17. "	"	"	"	"	"	A23	Adjust FM trap core, A23, until a slight effect is noted on sound side of response curve. (Fig. 7). Adjust by compressing or expanding coil turns.
18. "	"	79MC (12MC Swp)	77.25MC 81.75MC	5	"	A24, A25, A26, A27	Adjust for proper limits on response curve (Fig. 7).
19. "	"	69MC (12MC Swp)	67.25MC 71.75MC	4	"	A28, A29, A30, A31	"
20. "	"	63MC (12MC Swp)	61.25MC 65.75MC	3	"	A32, A33, A34, A35	"
21. "	"	57MC (12MC Swp)	55.25MC 59.75MC	2	"	A36, A37, A38, A39	Adjust for response similar to Fig. 7 for proper limits. Replace tuner shield and recheck channel 13 thru 2. Response of channel 13 thru 7 must be within limits of Fig. 6. Response on channels 6 thru 2 must be within limits of Fig. 7.

ALIGNMENT INSTRUCTIONS (cont)



FIG. 1

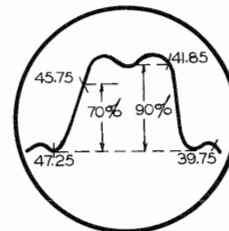


FIG. 2

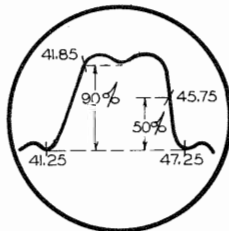


FIG. 3

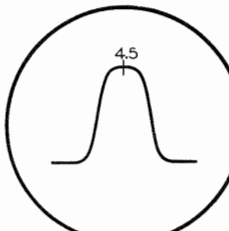


FIG. 4

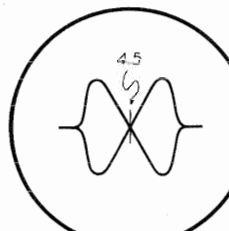


FIG. 5

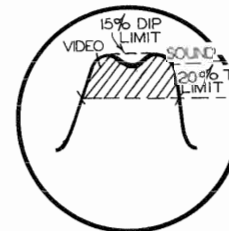


FIG. 6

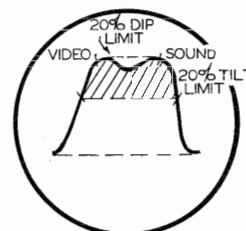


FIG. 7

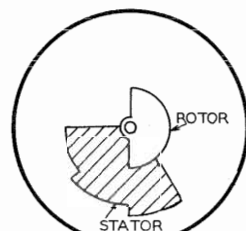


FIG. 8

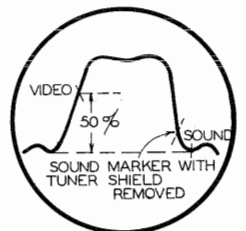


FIG. 9

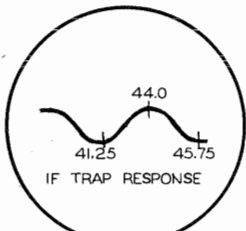


FIG. 10

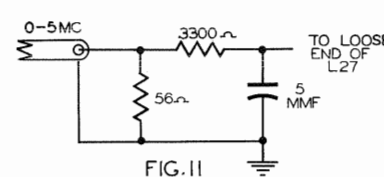


FIG. 11

OSCILLATOR ALIGNMENT

Remove tuner shield and 470MMF capacitor used in "RF & Mixer Alignment". Set fine tuning control to its mid-range position. See Fig. 8. Remove tuner AGC short and connect bias as under "Video IF Alignment". Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
22. Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	183MC (12MC Swp) 213MC (12MC Swp) 207MC (12MC Swp) 201MC (12MC Swp) 195MC (12MC Swp) 189MC (12MC Swp) 177MC (12MC Swp)	181.25MC 185.75MC 211.25MC 215.75MC 205.25MC 209.75MC 197.75MC 191.75MC 191.75MC 175.25MC 179.75MC	8 13 12 11 10 9 7	Vert. Amp. thru 27KΩ to point Ⓢ. Low side to chassis.	A40, A41	Adjust to place sound marker SLIGHTLY higher in frequency than the sound trap notch, due to removal of tuner shield. With shield in place, the sound marker should move down in trap notch. Check channels 7 thru 13 noting whether sound marker for each channel falls just above the trap notch with tuner shield removed. Response should be similar to Fig. 9. If more than a 30 degree rotation of fine tuning control is necessary to place sound marker in place on any high band adjust A41 by expanding or compressing coil turns. If A41 is adjusted it may be necessary to readjust A40 on channel 8.
23. "	"	85MC (12MC Swp)	83.25MC 87.75MC	6	"	A42	Check to see that fine tuning is at mid-position as in Fig. 8. Adjust A42 by compressing or expanding coil to place sound marker just above trap notch as in Fig. 9.
24. "	"	79MC (12MC Swp) 69MC (12MC Swp) 63MC (12MC Swp) 57MC (12MC Swp)	77.25MC 81.75MC 67.25MC 71.75MC 61.25MC 65.75MC 55.25MC 59.75MC	5 4 3 2	"	A43 A44 A45 A46	Adjust by compressing or expanding coil turns to place sound marker just above trap notch (Fig. 9) with fine tuning control within 10 degrees of position in Fig. 8. Replace tuner shield and check channels 13 thru 2 for proper tracking.

IF TRAP ALIGNMENT

Instructions are the same as for "Oscillator Alignment".

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
25. Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	44MC (10MC Swp)	41.25MC 44.0MC 45.75MC	2	Vert. Amp. thru 27KΩ to point Ⓢ. Low side to chassis.	A47	Increase sweep generator output to produce visible response on scope. Adjust A47 for MINIMUM response similar to Fig. 10.

UHF ALIGNMENT

Instructions are the same as for "RF & Mixer Alignment".

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
26. Direct	High side to point Ⓢ. Low side to chassis.	44MC (10MC Swp)	41.25MC 45.75MC	UHF or Channel 1 Position	Vert. Amp. to point Ⓢ. thru 27KΩ. Low side to chassis.	A48, A49, A50	Adjust A48 and A49 to position the sound and picture marker on response curve as in Fig. 7. Adjust A50 for MINIMUM curve tilt. Markers should not fall below the 20% limit on response curve. Replace tuner shield and recheck for correct response.

CHROMINANCE BANDPASS SYSTEM ALIGNMENT

Remove L27 by unsoldering one end which fastens to terminal #4 of video detector assembly (M13). Connect sweep generator to loose end of L27 thru network (Fig. 11). Remove the 3.58MC color oscillator tube (V26) from its socket. Connect a .05MFD capacitor from point Ⓢ to chassis. Set color intensity control (R7A) and contrast control (R5A) fully clockwise. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
27. Fig. 11	High side thru network (Fig. 11) to loose end of L27. Low side to chassis.	3MC (10MC Swp)	4.5MC	UHF or Channel 1 Position	Vert. Amp. to point Ⓢ. Low side to chassis.	A51	Adjust so that trap notch falls at 4.5MC. Use sufficient generator output so that trap notch is clearly defined (Fig. 12).
28. "	"	"	2.5MC	"	"	A52	Adjust to position 2.5MC marker on top of response curve similar to Fig. 12.
29. "	"	"	2.0MC 2.5MC 3.5MC 4.0MC 4.5MC	"	"	A53	Adjust A53 for MINIMUM tilt and a symmetrical response curve similar to Fig. 12. Check markers on response curve. If necessary SLIGHTLY retouch A51, A52 and A53 for desired response and marker positions.

3.58MC TRAP ALIGNMENT

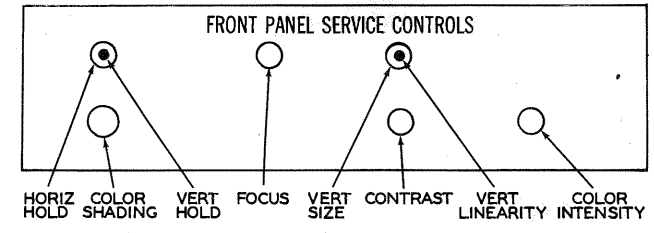
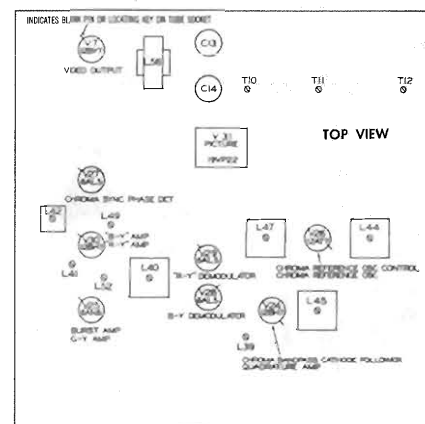
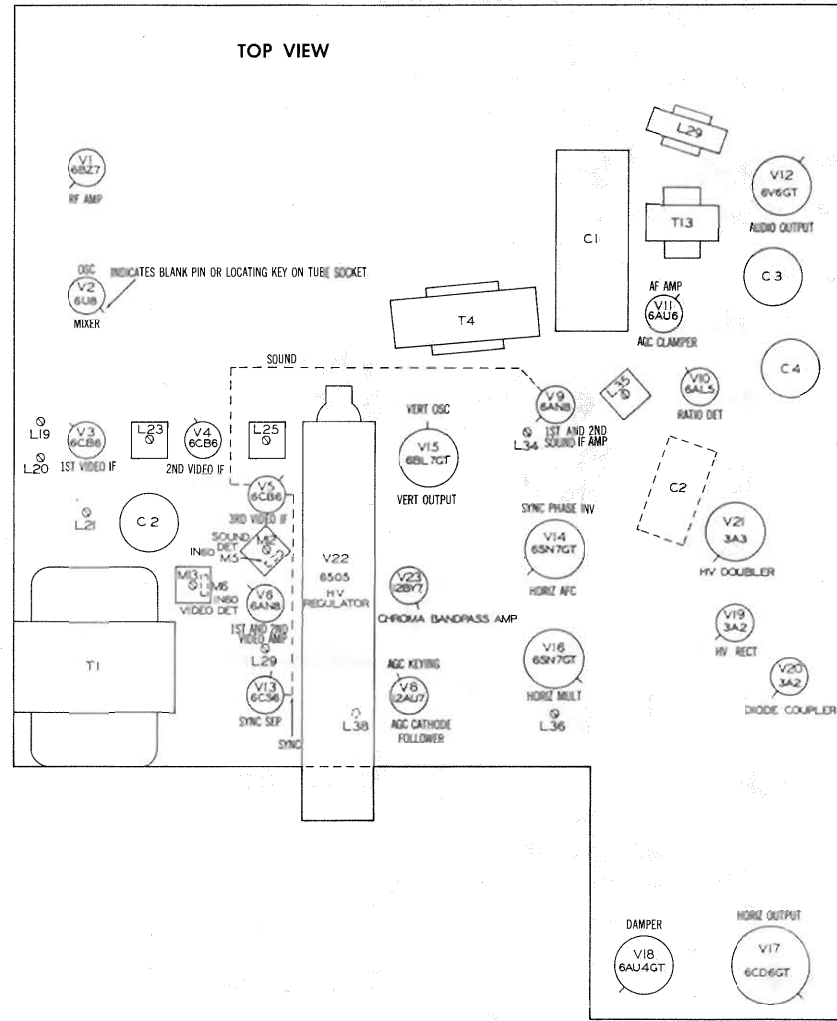
Remove .05MFD capacitor from point Ⓢ to chassis. Use same instructions as for "Chrominance Bandpass System Alignment".

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
30. Fig. 11	High side thru network (Fig. 11) to loose end of L27. Low side to chassis.	3MC (10MC Swp)	3.58MC	UHF or Channel 1 Position	Vert. Amp. thru detector probe (Fig. 13) to pin 4, 5 or 13 of picture tube. Low side to chassis.	A54	Adjust to place 3.58MC in trap notch similar to Fig. 14. Response curve must be free of any regeneration shown as sharp peak on response curve. Use sufficient generator output so that trap notch is clearly defined.

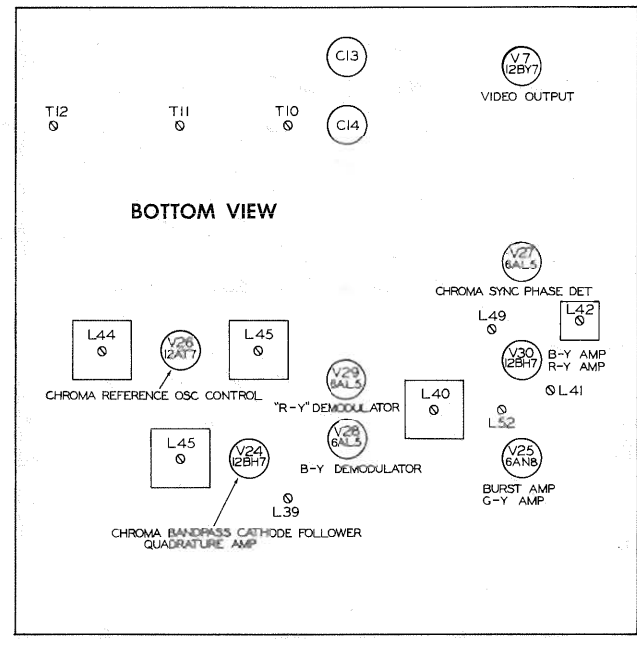
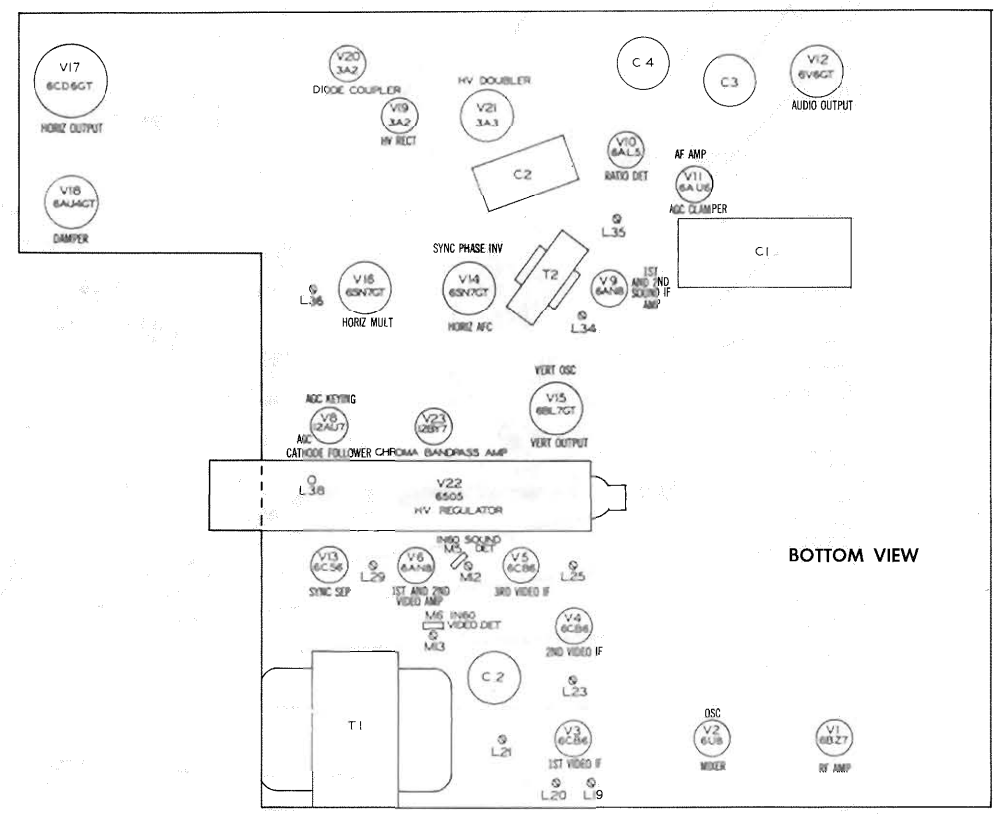
MOTOROLA MODELS 19CK1, B, 19CK2, B, 19CT1, B  
(Ch. 15-902A-03, -04 & Ch. BP-902A-01), 19CK1, B,  
19CK2, B, 19CT1, B (Ch. 15-902A-03, -04 & Ch. BP-902A-01)



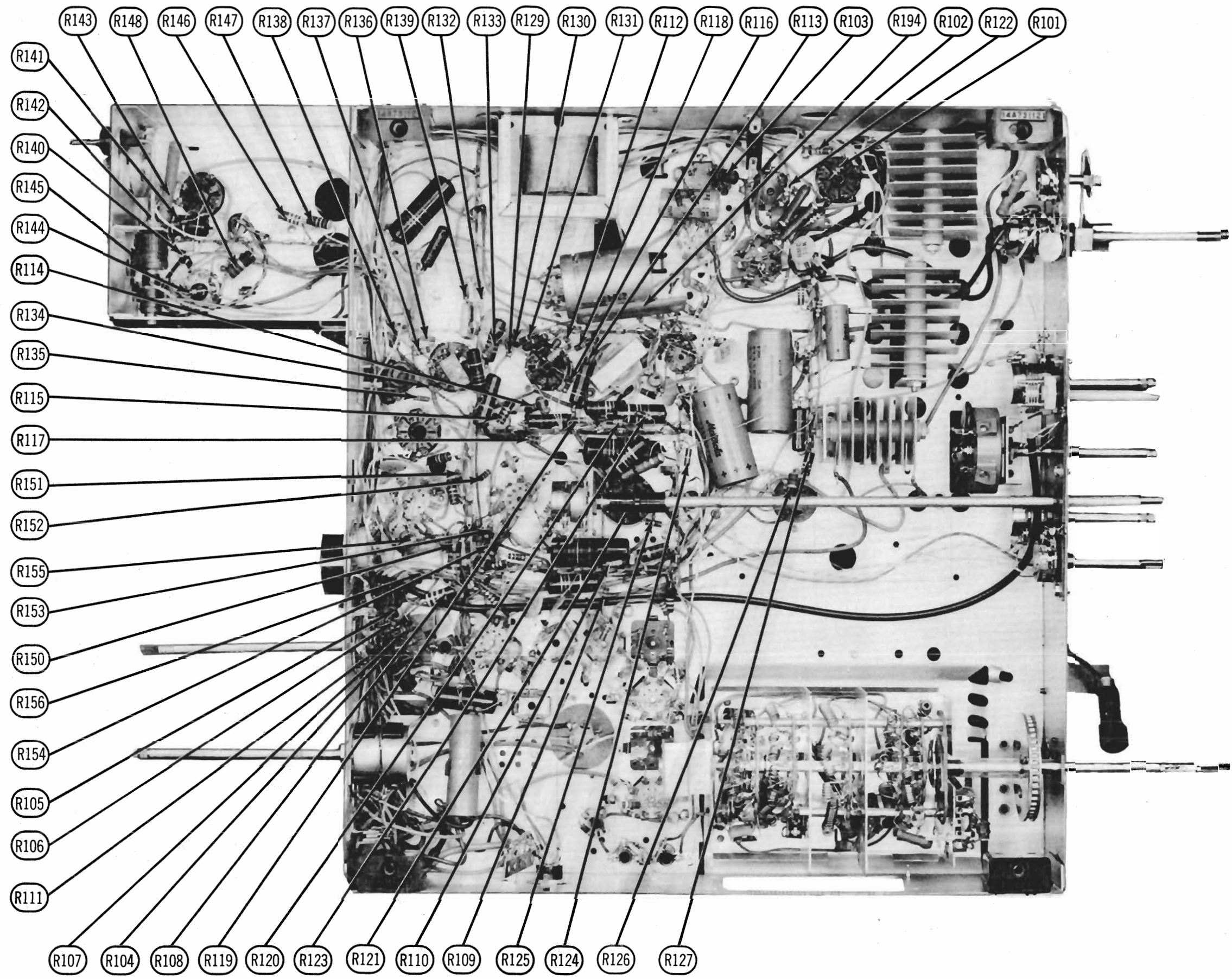
# TUBE PLACEMENT CHART



# TUBE PLACEMENT CHART

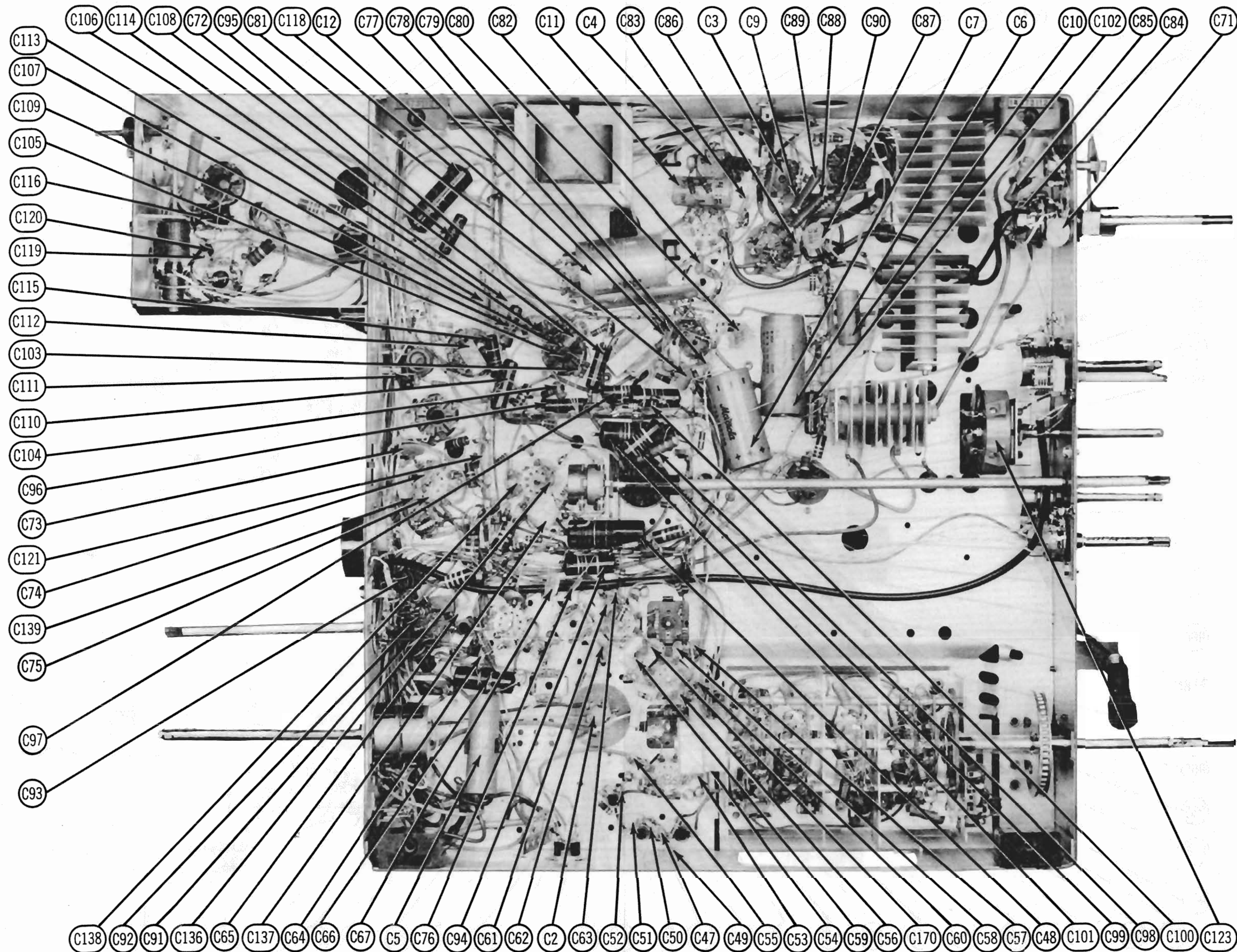


MOTOROLA MODELS 19CK1, B, 19CK2, B, 19CT1, B  
 (Ch. TS-902A-03, -04 & Ch. BP-902A-01), Y19CK1, B,  
 Y19CK2, B, Y19CT1, B (Ch. TS-902AV-03, -04 & Ch. BP-902A-01)



MOTOROLA MODELS 19CK1, B, 19CK2, B, 19CT1, B  
 (Ch. TS-902A-03, -04 & Ch. BP-902A-01), Y19CK1, B,  
 Y19CK2, B, Y19CT1, B (Ch. TS-902A1-03, -04 & Ch. BP-902A-01)

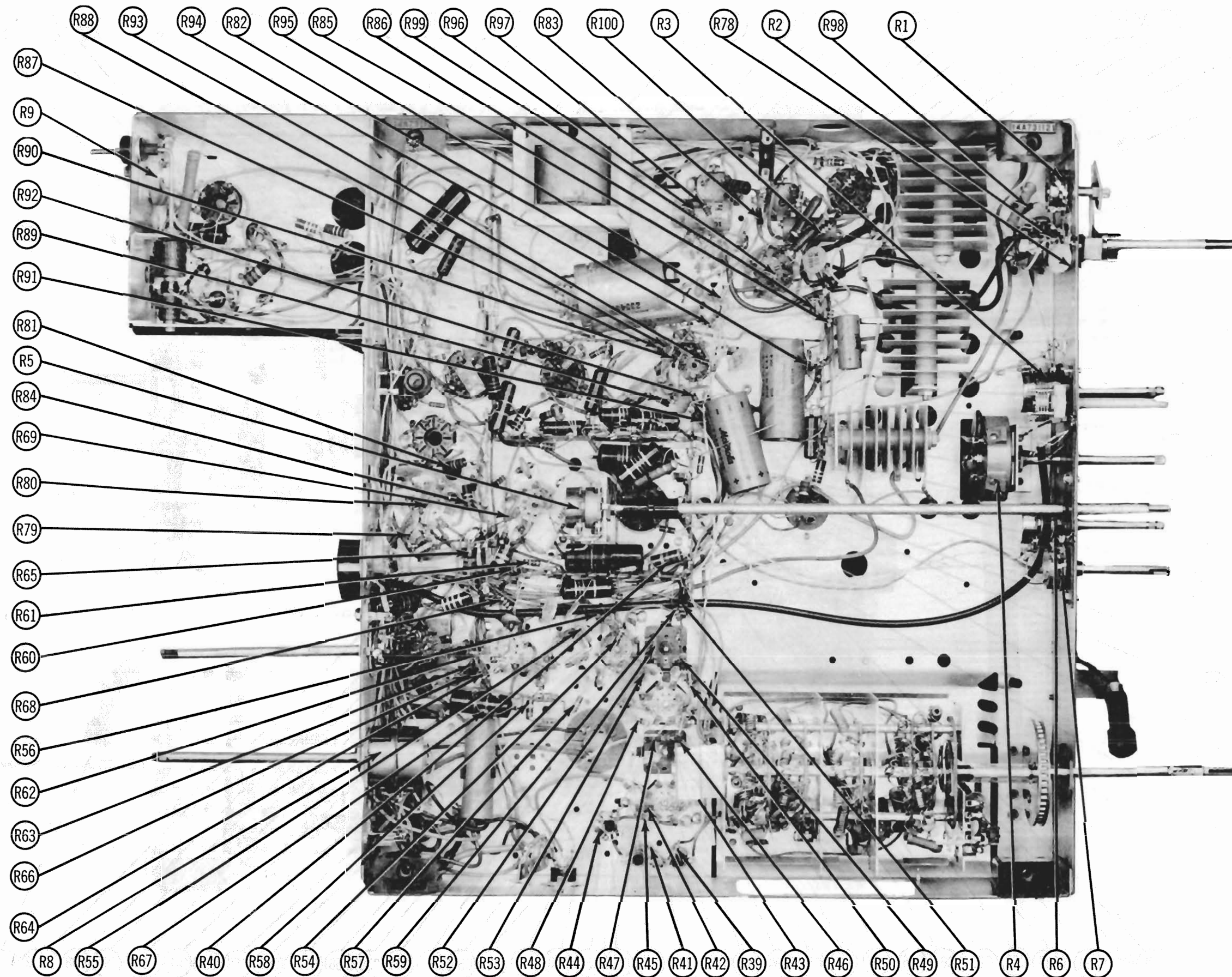
CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION (R101-R156)



MOTOROLA MODELS 19CK1, B, 19CK2, B, 19CT1, B  
 (Ch. TS-902A-03, -04 & Ch. BP-902A-01), Y19CK1, B,  
 Y19CK2, B, Y19CT1, B (Ch. TS-902AY-03, -04 & Ch. BP-902A-01)

CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

SET 283 FOLDER 9



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION (R1-R100)

MOTOROLA MODELS 19CK1, B, 19CK2, B, 19CT1, B  
 (Ch. 15-902A-03, -04 & Ch. BR-902A-01), Y19CK1, B,  
 Y19CK2, B, Y19CT1, B (Ch. 15-902AV-03, -04 & Ch. BR-902A-01)



## MISCELLANEOUS ADJUSTMENTS

### PURITY ADJUSTMENT

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

Remove any signal to the receiver and make the blue and green guns inoperative by shorting out their grids to chassis. Adjust the brightness control for a brighter than normal raster.

Loosen the four screws that hold the yoke cradle to allow movement of the yoke. If set has previously been adjusted for purity, a slight adjustment of yoke position should be sufficient.

Note position and location of the purity device, it consists of two magnetic rings between the blue corrector magnet and the dynamic convergence coils. Adjust to position the tabs of one ring opposite the tabs of the other ring until a minimum strength magnetic field is produced. When correct tabs of purity device are opposite each other, rotating both rings together should have no effect on the screen. If incorrect, position tabs on magnetic rings to place the tabs adjacent to each other. To check purity at the center of the screen, separate the tabs slightly to produce a weak magnetic field. Rotate the purity device to obtain best red purity in center of the screen. Continue adjusting the field strength and position of purity device tabs until the purity is best in center portion of the screen.

Move the yoke slightly backward or forward until best edge purity is obtained, then if necessary, readjust the purity device for best overall purity.

Remove ground from blue grid and ground red grid to chassis. Check the purity of the blue field. Remove ground from green grid and ground blue grid. Check the purity of the green field. If necessary to obtain best overall purity of all the colors, compromise the settings of the purity device.

Slightly favor the red field when adjusting for overall purity. Remove ground from grids of green, blue or red guns.

### DYNAMIC CONVERGENCE SYSTEM ADJUSTMENT

Turn the horizontal and vertical dynamic amplitude controls (R15A, R17A, R19A, R16B, R18B & R20B) fully clockwise.

Turn the vertical dynamic phase controls (R16A, R18A & R20A) to their mid-range position.

Position the shift lever so that the convergence coil pole pieces are positioned on the neck of picture tube. Connect a signal from a dot generator across antenna terminals and adjust the brightness of each beam so that each color dot is easily observed using the background (R10B & R11B) and screen (R10A, R11A & R12A) controls.

Adjust the three beam positioning magnets and the blue lateral magnet for best convergence at center of screen. Ground the blue and green grids and check purity using the red field. If necessary, slightly readjust the yoke assembly. Remove the ground from blue and green gun grids.

### VERTICAL DYNAMIC CONVERGENCE ADJUSTMENT

Using a dot pattern generator as a signal source, choose a vertical column of dots near the center of the screen. Notice that these dots are converged near the center of the screen and become over converged away from the center of the screen toward top and bottom.

Observe the position of the blue dot in each red, green and blue group along a vertical column of dots. Adjust the green and red vertical phase controls (R16A & R20A) until the red and green dots are converged and spaced symmetrically from the blue dots in each group. This is done to increase uniformity from middle of the screen to top and bottom. Adjust the blue vertical phase control (R18A) until blue dots in each group along a vertical line near center of the screen have the same relative position with respect to the green and red dots. If necessary, adjust the three beam positioning magnets for center convergence. Adjust the green vertical amplitude control (R16B) until position of the green dots are equally spaced from the blue dots from top to bottom. Then adjust the green beam positioning magnet (located over green gun in neck of tube) to reconverge the green dot with the blue at the center of the screen.

Adjust the red vertical amplitude control (R20B) until position of the red dots are equally spaced from the blue dots from top to bottom. Then adjust the red beam positioning magnet (over red gun) to reconverge the red dots with the blue at the center of the screen. Adjust the blue vertical amplitude control (R18B) until position of the blue dots are equally spaced from the green and red dots from top to bottom. Adjust the blue beam magnet (located over blue gun) for convergence of the vertical row of dots.

### HORIZONTAL DYNAMIC CONVERGENCE ADJUSTMENT

Leave dot pattern generator connected as under "Vertical Dynamic Convergence Adjustment".

Turn the blue horizontal dynamic amplitude control (R17A) fully clockwise. Adjust the red and green horizontal dynamic amplitude controls (R19A & R15A) fully counter clockwise. Adjust the blue horizontal phase coil (T8) until the blue dot is displaced a maximum amount from the green and red dots near the center of the screen. Adjust R17A fully counter clockwise. Using same procedure as for adjustment of T8, adjust the green horizontal phase coil (T7) and the red horizontal phase coil (T9) as above. R19A and R15A controls remain fully counter clockwise during adjustment of T7 and T9. Select one horizontal row of dots near center of the screen. Adjust R17A and T8 together to obtain the same amount of misconvergence of the blue dots at the center and edges of the screen. This will establish a horizontal line across the screen which will be used as reference positions for positioning the red and green dots. Adjust the blue beam positioning magnet (located over blue gun) for convergence of the blue dots near middle of the screen. Adjust R15A and T7 to obtain uniform and symmetrical displacement of the green dots away from the blue dots in all horizontal dot groups. Adjust the green beam positioning magnet (located over green gun) for convergence of the green dots near center of the screen.

Adjust R19A and T9 to obtain uniform and symmetrical displacement of the red dots away from the blue dots in all horizontal dot groups. Adjust the red beam positioning magnet (located over red gun) for convergence of red dots near center of the screen. Check the purity and if necessary, adjust the blue lateral magnet and the three beam positioning magnets for best overall convergence.

## MISCELLANEOUS ADJUSTMENTS (cont.)

### BALANCING THE BACKGROUND AND SCREEN CONTROL ADJUSTMENTS

Turn set on and select a station transmitting a black and white picture, preferably a test pattern.

Adjust contrast and brightness control for a normal picture.

Set green screen control (R10A), red screen control (R12A) and blue screen control (R11A) fully clockwise.

Set blue background control (R11B) and the green background control (R10B) for a maximum white amount of white portions on the screen.

Set the brightness control (R2A) toward its counter clockwise position until picture becomes a gray (less white). If when adjusting R2A a color starts to tint the screen, adjust screen control corresponding to this color until the bright portions are white or gray again. Readjust the brightness control (R2A) for normal brightness on the screen. Reset the background controls (R10B & R11B) so that brightness portions of picture appear white.

Repeat the above procedure until minimum tinting occurs over the usable range of the brightness control.

### HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

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

Normally the horizontal hold control will have a sync range of approximately 30 degrees. If the controls are too critical, adjust as follows.

1. Shunt the horizontal oscillator coil (L36) to ground with .25MFD, 400 volt capacitor. This may be done with the chassis in the cabinet by placing the capacitor across the 2 pin socket on rear panel of horizontal chassis.

2. With the horizontal size control, adjust the picture so the left edge of the raster can be seen. Adjust the horizontal hold control (R3A) until no blanking pulse appears and the picture just starts to fold on the left. (The blanking pulse is the gray bar just to the left edge of the raster.)

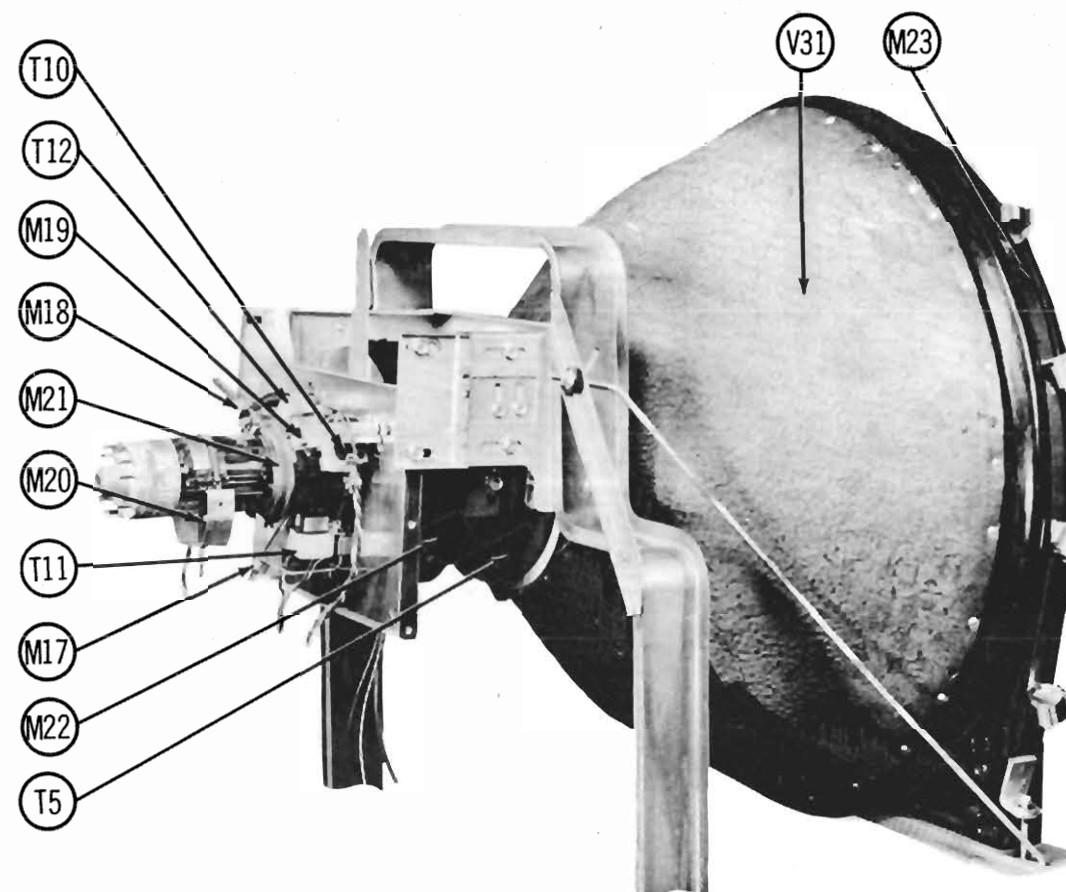
If may be necessary to adjust the contrast and brightness controls to make the pulse visible.

3. Remove the .25MFD capacitor across L36.

4. Adjust the horizontal oscillator coil slug (B1) until no sync pulse can be seen as in step #2.

Adjust the horizontal drive control (R9A) until white vertical bars or compression appears on the picture tube, then turn in opposite direction until bars or compression disappears.

Adjust the horizontal size adjustment (B2) for a picture slightly wider than necessary to fill the picture mask horizontally. Adjust the horizontal centering control (R8A) to shift the picture from left to right across the screen. Adjust R8A to center picture, preferably while viewing a test pattern.



PICTURE TUBE ASSEMBLY

MOTOROLA MODELS 19CK1, B, 19CK2, B, 19CT1, B  
(Ch. 15-902A-03, -04 & Ch. BR-902A-01), Y19CK1, B,  
Y19CK2, B, Y19CT1, B (Ch. 15-902A-03, -04 & Ch. BR-902A-01)



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

ITEM No.	USE	REPLACEMENT DATA			NOTES
		MOTOROLA PART No.	STANDARD REPLACEMENT	RETMA BASE TYPE	
V1	RF Amplifier	6BZ7	6BZ7	9AJ	
V2	Osc. - Mixer	6U8	6U8	9E	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	1st. Video Amp. - 2nd. Video Amp.	6AN8	6AN8	9DA	
V7	Video Output	12BY7	12BY7	9BF	
V8	AGC Cathode Follower - AGC Keying	12AU7	12AU7	9A	
V9	1st. Sound IF Amp. - 2nd. Sound IF Amp.	6AN8	6AN8	9DA	
V10	Ratio Detector	6AL5	6AL5	6BT	
V11	AF Amp. - AGC Clamper	6AV6	6AV6	7BT	
V12	Audio Output	6V8GT	6V8GT	7S	
V13	Sync Separator	6CS6	6CS6	7CH	
V14	Sync Phase Inv. - Horiz. AFC	6SN7GT	6SN7GTA	8BD	
V15	Vert. Osc. - Vert. Output	6BL7GT	6BL7GT	8BD	
V16	Horiz. Mult.	6SN7GTA	6SN7GTA	8BD	
V17	Horiz. Output	6CD6G	6CD6G	5BT	
V18	Damper	6AU4GT	6AU4GT	4CG	
V19	HV Rectifier	3A2	3A2		
V20	Diode Coupler	3A2	3A2		
V21	HV Doubler	3A3	3A3	8EZ	
V22	HV Regulator	6505	6505		
V23	Chroma Bandpass Amplifier	12BY7	12BY7	9BF	
V24	Chroma Bandpass Cathode Follower - Quadrature Amp.	12BH7	12BH7	9A	
V25	Burst Amplifier - "G-Y" Amplifier	6AN8	6AN8	9DA	
V26	Chroma Reference Osc. Control - Chroma Reference Osc.	12AT7	12AT7	9A	
V27	Chroma Sync Phase Det.	6AL5	6AL5	6BT	
V28	"B-Y" Demodulator	6AL5	6AL5	6BT	
V29	"R-Y" Demodulator	6AL5	6AL5	6BT	
V30	"B-Y" Amplifier - "R-Y" Amplifier	12BH7	12BH7	9A	

**CATHODE-RAY TUBE**

ITEM No.	REPLACEMENT DATA					NOTES
	MOTOROLA PART No.	CBS-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	
V31	19VP22	19VP22				

**CAPACITORS**

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

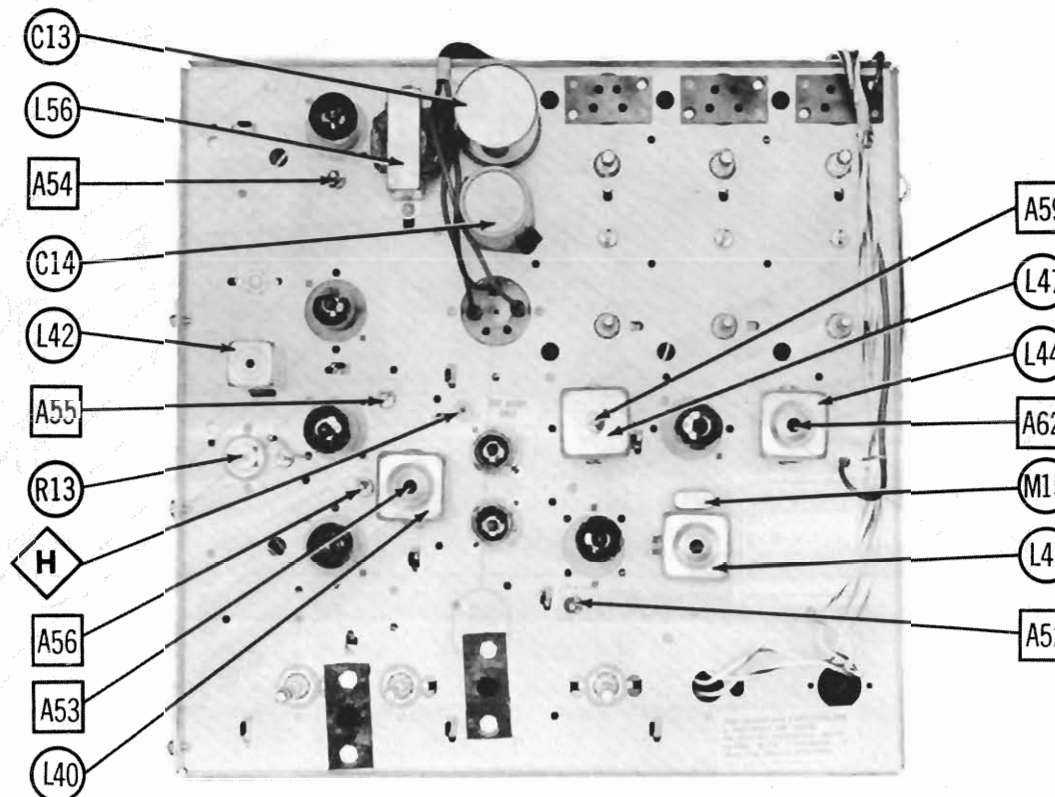
ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MOTOROLA PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.		
C1A	150	250	23B733207			FP217.7	TM-D150-	S-160		
B	150	250					250	S-160		
C2	200	150	23B722771							
C3A	200	150	23B734515			FP420.44	TM-3065			
B	50	250					TD-200-150			
C	30	400								
D	20	400								
C4A	150	300	23B721874			FP419.1	TM-4118	D-150		
B	10	250						T-405		
C	20	300								
D	250	50								
C5A	50	50	23A734545			TCD49	TDL-D50-	FMD-1550		
B	50	50					150			
C6	500	25	23K732636			TC2505	TD-500-25	MTH-2550	Note 2	
C7	450	10	23A732739				TD-450-15NP		Note 3	
C8	150	300								
C9	3	50	23A690543			TC30	TD-4-50	MMT-0505		
C10	3	50	23A690543			TC30	TD-4-50	MMT-0505		
C11	10	50	23A90205			TC32	TD-10-50	MT-0510		
C12A	10	200	23B734516			FP465	TM-4060	Q-335		
B	20	25								
C	10	250								
D	100	25								
C13A	10	300	23B734486							
B	500	15								
C	500	15							Note 4	
C14A	70	25	23B734496							
B	100	25								
C15	100	15	23K734273				TD-100-15NP	MTH-1525	Note 2	
C16	100	15	23K734273				TD-100-15NP	MTH-1525	Note 2	
C17	100	15	23K734273				TD-100-15NP	MTH-1525	Note 2	
C18	33		21R119912							
C19	27		21R119896							
C20	220		21R115905	D6-221	GP2K-221	UC-5322				
C21	4.7		21R115955	TCZ-4.7	NP0A-4R7	ZT-555				
C22	220		21R115905	D6-221	GP2K-221	UC-5322				
C23	1000		21R115386	DD-102	801-001	DC-521				
C24	1000		21R115386	DD-102	801-001	DC-521				
C25	1000		21R115386	DD-102	801-001	DC-521				
C26	1000		21R115386	DD-102	801-001	DC-521				

**PARTS LIST AND DESCRIPTIONS (Continued)**

**MISCELLANEOUS**

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M8	Dial Light		#44, Bayonet
M9	Tuner	1U733177 (WTT-67)	VHF - Not used in all versions of models 19CK1, 19CK1B, 19CK2, 19CK2B, 19CT1 & 19CT1B.
	Tuner	1U733178 (WTT-67Y)	VHF - Used in some versions of models 19CK1, 19CK1B, 19CK2, 19CK2B, 19CT1 & 19CT1B.
M10	Tuner	TT-37	UHF - Models Y19CK1, Y19CK1B, Y19CK2B, Y19CT1 & Y19CT1B.
M11	Variable Cap.	20A734484	Color Shading - (3.5-25MMF)
M12	4th Video IF Ass'y.	24C734522	Includes M5, Coils & Capacitors
M13	Video Det. Ass'y.	24C734521	Includes M6, Coils & Capacitors
M14	Delay Line	24B731805-A	Luminance Channel
M15	Crystal	48B732230	3.58MC Osc.
M16	Switch		Area Selector (Rotary - Wafer Type)
M17	Magnet	1V734887	Beam Positioning - Includes Magnet Retaining Arm
M18	Magnet	1V734887	Beam Positioning - Includes Magnet Retaining Arm
M19	Magnet	1V734887	Beam Positioning - Includes Magnet Retaining Arm
M20	Magnet	59A733739	Blue Beam Lateral Corrector
M21	Magnet	59A734820	Purity Control
M22	Ferrite Shield	42B735749	Yoke
M23	Picture Tube Rim		
	Purity Strap	1V735816	Includes Magnets
	Cabinet	16E733773	Models 19CK1 & Y19CK1
	Cabinet	16K733774	Models 19CK1B & Y19CK1B
	Cabinet	16R734159	Model 19CK2
	Cabinet	16R734161	Models 19CK2B & Y19CK2B
	Cabinet	16R733795	Models 19CT1 & Y19CT1
	Cabinet	16K733796	Models 19CT1B & Y19CT1B
	Knob	36K733398	VHF Channel Sel. - Models 19CK1, 19CK1B, 19CK2, 19CK2B, 19CT1 & 19CT1B.
	Knob	36B733397	VHF Channel Sel. - Models Y19CK1, Y19CK1B, Y19CK2B, Y19CT1 & Y19CT1B.
	Knob	36A734769	Color Shade
	Knob	36B712294	Area Selector Switch
	Knob	36C733399	Brightness
	Knob	36A734772	Contrast & Chroma
	Knob	36B733395	Fine Tuning & On/Off/Volume
	Knob	36C730167	Tone
	Knob	36C734253	Medallion
	Jewel	61B730644	Dial Light
	Safety Glass	61K733730	
	Mask	13F733733	

MOTOROLA MODELS 19CK1, B, 19CK2, B, 19CT1, B  
(Ch. 15-902A-03, -04 & Ch. BR-902A-01), Y19CK1, B,  
Y19CK2, B, Y19CT1, B (Ch. 15-902A-03, -04 & Ch. BR-902A-01)



**VERTICAL CHASSIS TOP VIEW**



**PARTS LIST AND DESCRIPTIONS (Continued)**  
COILS (cont)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L29	4.5MC Trap	1.2Ω		24B731883	20-1004	TV-151	1469	Core part #46B790943
L30	Shunt							
L31	Peaking Coil Series	7.5Ω			19-3250	TV-185	6154	226 Microhenries
L31	Peaking Coil	7Ω		24R121805	19-4200	TV-185*	6154*	222 Microhenries; Wound on 10KΩ resistor - Core part #46B790943
L32	3.58MC Trap	2.7Ω		1V732586			1469	Core part #46B790943
L33	Shunt							
L34	Peaking Coil	9.3Ω		24R119856	19-3300	TV-190	6155	330 Microhenries
L34	2nd Sound IF	1.8Ω		1V733254	20-1004	TV-151	1470	
L35	Ratio Det.	6.8Ω	1.4ΩCT	24C734459	17-3497	TV-115	6205	Tertiary winding-.8Ω
L36	Horiz. Osc.	38Ω		24K721065	19-1576	TV-163	6210	Core part #46A780344
L37	Shunt							
L38	Peaking Coil	8.3Ω		24R119855	19-3300	TV-190	6155	300 Microhenries
L38	3.58MC Band-pass Amp.	7.5Ω	1.5Ω	24K734252				
L39	Bandpass cathode follower	.7Ω	6.3Ω	24B734844				
L40	Bandpass cathode follower	40Ω	40Ω	24B733747				
L41	3.58MC Burst Amp. Coil	1.1Ω		24B734843				Tapped at .2Ω - Core part #46B790943
L42	3.58MC Burst Amp. Trans.	6Ω	2.4ΩCT	24C734483	17-6012			
L43	RF Choke	2Ω		24R121453	19-6033		4626	27 Microhenries; Wound on 560Ω resistor
L44	Reactance Coil	4.4Ω		24B732205	17-6015			Core part #46B790943
L45	3.58MC Osc.			1V734277				Tapped at .4Ω; Includes caps. - Core part #46B790943
L46	RF Choke	8.5Ω		24R119855	19-3300	TV-190	6155	300 Microhenries
L47	Quadrature Trans.			24B733760				Includes caps. -R-Y winding-.7Ω; Tapped at .3Ω - B-Y winding-.7Ω
L48	Series							Core part #46K732255
L48	Peaking Coil	19.5Ω		24B732672	19-4950		4652	900 Microhenries
L49	3.58MC Trap	5.5Ω		1V732207			1470	
L50	Series							
L50	Peaking Coil	75Ω		24K733200	19-5101	BC-502	4664	1750 Microhenries
L51	Series							
L51	Peaking Coil	19.5Ω		24B732672	19-4950		4652	900 Microhenries
L52	3.58MC Trap	5.5Ω		1V732207				Core part #46B790943
L53	Series							
L53	Peaking Coil	75Ω		24K733200	19-1501	BC-502	4664	1750 Microhenries

\* Use trap winding only.  
 ■ Use one winding only.  
 ▲ Use adaptor plate, drill mounting holes and retune.  
 ◆ Parallel with 10KΩ resistor.  
 ● Parallel with 500Ω resistor.

**FILTER CHOKE**

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT)	MOTOROLA PART No.	Holladson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triod PART No.
L54	.380ADC	28.2Ω	1.1HY	25B734495A	C5041		C-2328		C-23X
L55	.170ADC	22.6Ω	.43HY	25B734908	C5041				
L56	.015A-.050A	39Ω	2HY	25B734494					

Ⓞ Drill one new mounting hole.

**SELENIUM RECTIFIER**

ITEM No.	RATING CURRENT	REPLACEMENT DATA						NOTES
		MOTOROLA PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.460ADC	48B733746	1268				607	
M2	.460ADC	48B733746	1268				607	
M3	.170ADC	48B733961	1255A	8RS200	8S200		307	

**FUSES**

ITEM No.	TYPE	RATING	REPLACEMENT DATA								
			MOTOROLA PART No.		LITTELFUSE PART No.		BUSS PART No.				
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER			
M4	1" piece of #26 wire										

**CRYSTAL DIODES**

ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		MOTOROLA PART No.	SYLVANIA PART No.	
M5	1N60	48C711052*		Sound Det.
M6	1N60	48C711052*		Video Det.
M7	1N60	48C711052*		Burst Boost Pulse Clamping

\* Alternate part #48K711077.

**PARTS LIST AND DESCRIPTIONS (Continued)**  
CAPACITORS (cont)

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MOTOROLA PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.		
C27A	1000		21R400937	DD2-102	812-001	DCD-521				
C28	5-3		21K710943	829-3	3115-01-OR5	CT565A				
C29	56		21R120204	TCN-56	N750L-560	NT-5456				
C30	1.5		21R115959	TCZ-1.5	NP0A-IR5	ZT-5515				
C31	5-3		21K710943	829-3	3115-01-OR5	CT565A				
C32	1.5		21R115959	TCZ-1.5	NP0A-IR5	ZT-5515				
C33	1.5		21R115959	TCZ-1.5	NP0A-IR5	ZT-5515				
C34	22		21R120203	D6-220	CPK-220	UC-5422				
C35	5-3		21K710943	829-3	3115-01-OR5	CT565A				
C36	1		21R114071	TCZ-1	NP0A-010	UC-5422				
C37	5-3		21K710943	829-3	3115-01-OR5	CT565A				
C38	1000		21R115386	DD-102	801-001	DC-521				
C39	10	1500	21R400050							
C40	1000		21R115386	DD-102	801-001	DC-521				
C41	1000		21R115386	DD-102	801-001	DC-521				
C42	1000		21R115386	DD-102	801-001	DC-521				
C43	4		21R115953							
C44	680		21R410124	DD-681	811-681	UC-5368				
C45	680		21R410124	DD-681	811-681	UC-5368				
C46	680		21R410124	DD-681	811-681	UC-5368				
C47	470		21R114554	DD-471	831-471	UC-5347				K-1347
C48	.1	600	8K490263	DF-104		PT801	IMP6-P1			33061
C49	470		21R114554	DD-471	831-471	UC-5347				K-1347
C50	82		21R121598							
C51	82		21R121598							
C52	470		21R114554	DD-471	831-471	UC-5347				K-1347
C53	470		21R114554	DD-471	831-471	UC-5347				K-1347
C54	470		21R114554	DD-471	831-471	UC-5347				K-1347
C55	470		21R114554	DD-471	831-471	UC-5347				K-1347
C56	470		21R114554	DD-471	831-471	UC-5347				K-1347
C57	470		21R114554	DD-471	831-471	UC-5347				K-1347
C58	470		21R114554	DD-471	831-471	UC-5347				K-1347
C59	470		21R114554	DD-471	831-471	UC-5347				K-1347
C60	470		21R114554	DD-471	831-471	UC-5347				K-1347
C61	470		21R114554	DD-471	831-471	UC-5347				K-1347
C62	470		21R114554	DD-471	831-471	UC-5347				K-1347
C63	470		21R114554	DD-471	831-471	UC-5347				K-1347
C64	10		21R121114	TCN-10	N750K-100	NT-541				KR-1410
C65	120		21R115730	TCN-120	N750L-121					KR-1312
C66	.1	400	8K490236	DF-104		PT401	IMP4-P1			330401
C67	5000		21R115312	DD-502	811-005	DC-525				C-1250
C68	.1	400	8K490236	DF-104		PT401	IMP4-P1			330401
C69	39		21R121468	TCN-39	N750K-390					KR-1439
C70	.1	400	8K490236	DF-104		PT401	IMP4-P1			330401
C71	10000		21R482726	DD-103	811-01	DC-511				
C72	.001	1000	8K490268	DD16-102	IR5KV-102	PT1621	CT16-001			2116-.001
C73	10000		21R482726	DD-103	811-01	DC-511				
C74	10000		21R482726	DD-103	811-01	DC-511				
C75	2000		21R121106	DD-202	801-002	DC-522				C-1220
C76	100		21R410036	D6-101	801-101	UC-531				K-1310
C77	5000		21R115312	DD-502	811-005	DC-525				C-1250
C78	10000		21R482726	DD-103	811-01	DC-511				
C79	100		21R410036	D6-101	801-101	UC-531				K-1310
C80	10000		21R482726	DD-103	811-01	DC-511				
C81	10000		21R482726	DD-103	811-01	DC-511				
C82	470		21R115856	DD-471	831-471	UC-5347				K-1347
C83	1000		21R410127	DD-102	801-001	DC-521	IMP6-D1			K-1210
C84	5000		21R115312	DD-502	811-005	DC-525	IMP6-D5			C-1250
C85	4700		21R115867	DD-502	811-005	DC-525	IMP6-D47			C-1247
C86	470		21R115856	DD-471	831-471	UC-5347				K-1347
C87	10000		21R482726	DD-103	811-01	DC-511	IMP6-S1			330611
C88	4700		21R115867	DD-502	811-005	DC-525	IMP6-D47			C-1247
C89	4700		21R115867	DD-502	811-005	DC-525	IMP6-D47			C-1247
C90	4700		21R120149	DD-502	811-005	DC-525	IMP6-D47			C-1247
C91	.022	400	8K490228	DF-203	817-02	CUB4822	IMP4-S22			3304122
C92	470		21R115856	DD-471	831-471	UC-5347				
C93	.1	400	8K490236	DF-104		PT401	MP4-P1			330401
C94	.047	400	8K119350	DF-503		PT4147	MP4-S47			3304147
C95	.0047	600	8K490249	D6-472	GP2-333-472	PT6247	IMP6-D47			3306247
C96	.0047	400	8K490222	D6-472	GP2-333-472	PT6247	IMP6-D47			3306247

**CAPACITORS (cont)**

ITEM No.	RATING CAP. VOLT	REPLACEMENT DATA					NOTES
		MOTOROLA PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	
C134	.01	8K490226	D6-103	GP2-333-103	PT411	IMP4-S1	330411
C135	.047	8K490206	DF-503	IMP2-547	PT417	IMP2-547	3302147
C136	.1	8K490236	TCN-10	N750K-100	NT-541		KR-1410
C137	10000	21R482726	DD-103	811-01	DC-511		330601
C138	10000	21R482726	DD-103	811-01	DC-511		KR-1410
C139	10000	21R482726	DD-103	811-01	DC-511		
C140	10	21R121114	TCN-10	N750K-100	NT-541		
C141	10000	21R482726	DD-103	811-01	DC-511		
C142	10000	21R482726	DD-103	811-01	DC-511		
C143	33	21K121548	TCN-33	N750K-330	NT-5433		KR-1433
C144	33	21K121548	TCN-33	N750K-330	NT-5433		KR-1433
C145	33	21K121548	TCN-33	N750K-330	NT-5433		KR-1433
C146	33	21K121548	TCN-33	N750K-330	NT-5433		KR-1433
C147	270	21R8624	TCZ-270	NP0-333-271	MCE241		KR-1327
C148	10000	21R482726	DD-103	811-01	DC-511		
C149	5	21R115955	TCZ-5	NP0A-050	ZT-555		K-1550
C150	10000	21R482726	DD-103	811-01	DC-511		
C151	1500	21R120100	DD-152	801-0015	DC-5215		K-1215
C152	1500	21R120100	DD-152	801-0015	DC-5215		K-1215
C153	10000	21R482726	DD-103	811-01	DC-511		
C154	.01	8K490226	D6-103	GP2-333-103	PT411	IMP4-S1	330411
C155	.22	8K490212	D6-103	GP2-333-103	PT411	IMP2-P22	3302022
C156	2	21R15948	TCZ-2.2	NP0A-2R2	PT4022		
C157	10000	21R482726	DD-103	811-01	DC-511		
C158	5	21R115955	TCZ-5	NP0A-050	ZT-555		KR-1550
C159	10000	21R482726	DD-103	811-01	DC-511		
C160	100	21R115900	D6-101	GP1K-101	UC-531		K-1310
C161	56	21R115641	TCN-56	N750K-560			KR-1456
C162	10000	21R482726	DD-103	811-01	DC-511		
C163	10000	21R482726	DD-103	811-01	DC-511		
C164	10000	21R482726	DD-103	811-01	DC-511		
C165	10000	21R482726	DD-103	811-01	DC-511		
C166	5	21R115955	TCZ-5	NP0A-050	ZT-555		KR-1550
C167	5	21R115955	TCZ-5	NP0A-050	ZT-555		KR-1550
C168	2	21R115948	TCZ-2.2	NP0A-2R2			
C169	.047	1000	DD-471	831-471	UC-5347	CT10-S5	2110-.05
C170	1.0	21R14554	DD-471	831-471	UC-5347		K-1347

Note 1. In some versions, C4A is 200MFD single unit (part #23B722771).  
 Note 2. Non-polarized unit.  
 Note 3. Not used in some versions.  
 Note 4. C13C is not used.  
 \* Connect negative terminals together.

**CONTROLS**

ITEM No.	RATING RESIST-ANCE WATTS	REPLACEMENT DATA					INSTALLATION NOTES
		MOTOROLA PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	1Meg	18A733887	Q11-137	A47-1Meg-S	AB-69	U-54	Tone
R2A	100KΩ	18B732228	Not Req.	KSS-3	AK-4	Not Req.	Attach to R1A
B	1Meg	18B733738	*QJ-643		UE1178		Brightness - Panel
C	100KΩ	18B733738	*QJ-643		UE1178		Volume tapped at 300KΩ - Rear
R3A	100KΩ	18B733738	*QJ-643		UE1178		Attach to R2B
B	200KΩ	18B733738	*QJ-643		UE1178		Vert. Hold - Panel
R4	2.5Meg	18K733743			UF15L		Attach to R2B
R5A	500Ω	18B731886			UR254		Vert. Hold - Rear
B	1000Ω	18B731886			SBBT-746		Focus
C	1000Ω	18B731886			UF751-T52		Tapped at 350Ω - Panel
R6A	2MΩ	18B731880	*QJ-644		UR13L		Tapped at 350Ω - Rear
B	2000Ω	18B731880	*QJ-644		DS-36		Contrast
R7A	10KΩ	18B732223	Q17-116	A47-10K-V	FI-67		Attach to R5A
B	10KΩ	18B732223	Not Req.	KSS-3	UE23L		Vert. Linear - Rear
R8A	20Ω	18B731827	Not Req.	KSS-3	AK-4		Color Intensity
B	20Ω	18B731827	Not Req.	KSS-3	AK-4		Attach to R7A
R9A	5000Ω	18K734928	4WK-5000	A10-5000	SVP-989	M5MPK	Horiz. Centering tapped at 10Ω - Panel (Wire wound)
B	5000Ω	18K734928	Not Req.	FKS-1/4	Not Req.	Not Req.	Vert. Centering tapped at 10Ω - Rear (Wire wound)
R10A	500Ω	18B731833	*QJ-645		FI-78	UE3100	Horiz. Drive
B	500Ω	18B731833	*QJ-645		UE3100	UE3100	Attach to R9A
R11A	500Ω	18K731834	*QJ-646		FI-78	UE3100	Green Screen - Panel
B	500Ω	18K731834	*QJ-646		FI-78	UE3100	Blue Background - Rear
R12A	500Ω	18A734621	Q11-140	A47-3Meg-S	AB-84	U-59	Blue Screen - Panel
B	500Ω	18A734621	Not Req.	KSS-3	AK-4	Not Req.	Blue Background - Rear
R13	1000Ω	18K732740	Not Req.	KSS-3	AK-4	Not Req.	Red Screen
R14	250KΩ	18A734485	Q11-103	A47-500-S	AB-4	U-2	Attach to R12A
R15A	500Ω	18K734497	Q11-103	A47-500-S	AB-4	U-2	Blue Gain (Wire wound)
B	500Ω	18B733740	Not Req.	KSS-3	AK-4	Not Req.	AFC Balance
R16A	100Ω	18B733740	Not Req.	KSS-3	AK-4	Not Req.	Green Horiz. Conv. Amp.
B	2500Ω	18B733740	Not Req.	KSS-3	AK-4	Not Req.	Attach to R15A
R17A	500Ω	18K734497	Q11-103	A47-500-S	AB-4	U-2	Green Vert. Conv. Phase
B	500Ω	18K734497	Not Req.	KSS-3	AK-4	Not Req.	tapped at 50Ω - Panel
R18A	100Ω	18B733740	Not Req.	KSS-3	AK-4	Not Req.	Green Vert. Conv. Amp.
B	2500Ω	18B733740	Not Req.	KSS-3	AK-4	Not Req.	tapped at 50Ω - Rear
R19A	500Ω	18K734497	Q11-103	A47-500-S	AB-4	U-2	Blue Horiz. Conv. Amp.
B	500Ω	18B733740	Not Req.	KSS-3	AK-4	Not Req.	Attach to R17A
R20A	100Ω	18B733740	Not Req.	KSS-3	AK-4	Not Req.	Blue Vert. Conv. Phase
B	2500Ω	18B733740	Not Req.	KSS-3	AK-4	Not Req.	tapped at 50Ω - Panel
R21A	100Ω	18B733740	Not Req.	KSS-3	AK-4	Not Req.	Blue Vert. Conv. Amp. - Rear
B	2500Ω	18B733740	Not Req.	KSS-3	AK-4	Not Req.	Red Horiz. Conv. Amp.
R22A	100Ω	18B733740	Not Req.	KSS-3	AK-4	Not Req.	Attach to R19A
B	2500Ω	18B733740	Not Req.	KSS-3	AK-4	Not Req.	Red Vert. Conv. Phase
B	2500Ω	18B733740	Not Req.	KSS-3	AK-4	Not Req.	tapped at 50Ω - Panel
B	2500Ω	18B733740	Not Req.	KSS-3	AK-4	Not Req.	Red Vert. Conv. Amp. - Rear

† Universal replacement (Mallory exact duplicate part no. UE118)  
 †† Universal replacement (Mallory exact duplicate part no. UE12)  
 ††† Universal replacement (Mallory exact duplicate part no. UE1712)  
 \* CONCENTRIKIT EQUIVALENT: KIT K-4, BASE ELEMENTS & SHAFTS: B11-128 & P10-308 (PANEL) B13-137X & R13-331 (REAR) 76-A-9H7523  
 \*\* CONCENTRIKIT EQUIVALENT: KIT K-2, BASE ELEMENTS & SHAFTS: B11-128 & P9-209 (PANEL) B11-129 & R11-216 (REAR)  
 \*\*\* CONCENTRIKIT EQUIVALENT: KIT K-2, BASE ELEMENTS & SHAFTS: B11-139 & P9-209 (PANEL) B11-110 & R11-216 (REAR)  
 ■ CONCENTRIKIT EQUIVALENT: KIT K-2, BASE ELEMENTS & SHAFTS: B11-140 & P9-32 (PANEL) B11-103 & R11-19 (REAR)  
 ■■ CONCENTRIKIT EQUIVALENT: KIT K-2, BASE ELEMENTS & SHAFTS: B11-140 & P9-212 (PANEL) B11-108 & R11-219 (REAR)

**PARTS LIST AND DESCRIPTIONS (Continued)**

ITEM No.	RATING OHMS WATT	REPLACEMENT DATA		NOTES	ITEM No.	RATING OHMS WATT	REPLACEMENT DATA		NOTES
		MOTOROLA PART No.	IRC PART No.				MOTOROLA PART No.	IRC PART No.	
R21	1Meg	6R3964	BTS-1Meg		R109	100KΩ	6R6031	BTS-100K	
R22	1800Ω	6R5687	BTB-1800		R110	33KΩ	6R6410	BTS-33K	
R23	2200Ω	6R6056	BTB-2200		R111	5600Ω	6R6428	BTS-5600	
R24	47KΩ	6R6056	BTS-47K		R112	220KΩ	6R6407	BTS-220K	
R25	22KΩ	6R6397	BTS-22K		R113	2200Ω	6R6069	BTS-2200	
R26	820KΩ	6R6429	BTS-820K		R114	4.7Ω	17K488266		
R27	1000Ω	6R6229	BTA-1000		R115	6.8Ω			
R28	3900Ω	6R6559	BTS-3900		R116	6800Ω	6R6428	BTS-6800	
R29	820Ω	6R6269	BTS-820		R117	2200Ω	6R6069	BTS-2200	
R30	680KΩ	6R6475	BTS-680K		R118	22KΩ	6R6397	BTS-22K	
R31	1200Ω	6R6393	BTS-1200		R119	4700Ω	6R6080	BTS-4700	
R32	15KΩ	6R6477	BTS-15K		R120	390KΩ	6R6446	BTS-390K	
R33	1000Ω	6R6229	BTS-1000		R121	820KΩ	6R6077	BTS-820K	
R34	12KΩ	6R5776	BTB-12K		R122	10KΩ	6R6031	BTS-10K	Note 2
R35	10KΩ	6R6054	BTS-10K		R123	10KΩ	6R6031	BTS-10K	
R36	22KΩ	6R6028	BTS-22K		R124	2.2Meg	6R6433	BTS-2.2Meg	
R37	22KΩ	6R6028	BTS-22K		R125	8Ω	6R2035	BTS-8Ω	
R38	270KΩ	6R6414	BTS-270K		R126	820Ω		BTA-820	Note 1
R39	15KΩ	6R6477	BTS-15K		R127	47KΩ	6K121900	BTA-47K	
R40	820Ω	6K121897	BTB-820		R128	300Ω	6R5701	BTS-300	
R41	12KΩ	6R6394	BTS-12K		R129	300KΩ	6R6031	BTS-300K	
R42	470Ω	6R6949	BTS-470		R130	100KΩ	6R6031	BTS-100K	
R43	470Ω	6R6949	BTS-470		R131	100KΩ	6R6031	BTS-100K	
R44	10KΩ	6R6320	BTS-10K		R132	3900Ω	6R5659	BTS-3900	
R45	47Ω	6R5550	BTS-47		R133	4.7Meg	6R2122	BTS-4.7Meg	
R46	470Ω	6R6394	BTS-470		R134	1000Ω	6R6229	BTS-1000	
R47	12KΩ	6R6394	BTS-12K		R135	5600Ω	6R6117	BTS-5600	
R48	47Ω	6R5550	BTS-47		R136	68KΩ	6R6074	BTS-68K	
R49	470Ω	6R6394	BTS-470		R137	47KΩ	6R6048	BTS-47K	
R50	470Ω	6R3949	BTS-470		R138	3300Ω	6R5581	BTS-3300	
R51	27KΩ	6K121901	BTA-27K		R139	10KΩ	6R6320	BTS-10K	
R52	18KΩ	6R5591	BTS-18K		R140	1Meg	6R6046	BTS-1Meg	
R53	120Ω	6R5551	BTS-120		R141	100Ω	6R6326	BTS-100	
R54	470Ω	6R6949	BTS-470		R142	68Ω	6R6007	BTS-68	
R55	18KΩ	6R5591	BTS-18K		R143	5000Ω	17R121123	1 3/4A-5000	
R56	1000Ω	6R6229	BTS-1000		R144	22KΩ	6R6397	BTS-22K	
R57	22KΩ	6R6397	BTS-22K		R145	3900Ω	6R476012	BTS-3900	
R58	100KΩ	6R6075	BTS-100K		R146	470KΩ	6K121893	BTA-470K	
R59	680KΩ	6R6475	BTS-680K		R147	470KΩ	6K121893	BTA-470K	
R60	27KΩ	6R6434							