

CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

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

1. Set the horizontal hold control to its mid-range position.
2. Connect a short clip lead across horizontal stabilizer coil (L20).
3. Adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.
4. Remove short from L20.
5. Connect the vertical amplifier of an oscilloscope thru a low

capacitor probe to junction of L19, L20, R72 and C71. Low side to chassis. Adjust the horizontal phase slug (B2) until waveform similar to Fig. 5 is obtained. While making this adjustment keep the picture in sync with the horizontal hold control and if necessary B1.

6. Remove scope from junction of L19, L20, R72 and C71.
7. Turn the horizontal hold control fully counter clockwise. The picture should fall out of sync at both extreme ends of the horizontal hold control with equal number of sloping diagonal bars at both ends. If necessary, repeat steps 1 thru 6.

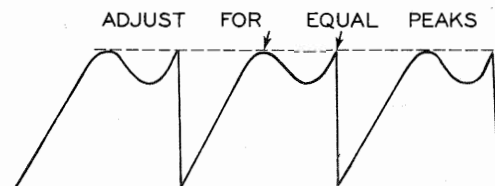
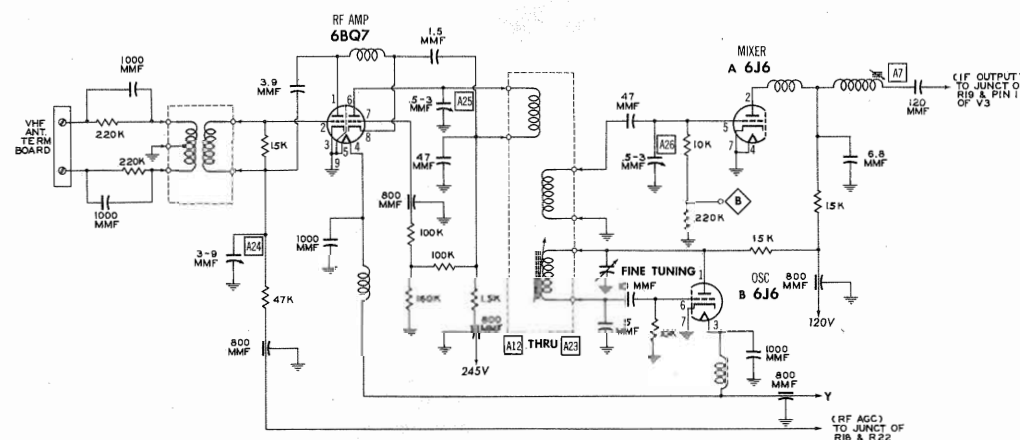


FIG. 5



VHF TUNER USED WITH CHASSIS 21T24, 21T25, AND 21T27

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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ALTERNATE TUNER SCHEMATIC

PHOTOFACT* Folder



DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 4 push-on type control knobs from top panel of cabinet.
2. Remove 5 metal screws. Remove rear cover.
3. Remove 4 metal screws at side and top of cabinet.
4. Slide side panel strip off runners to the rear of the cabinet.
5. Lift top half of cabinet straight up and off.



MODELS

CHASSIS

M-1761E, M-1762A, M-1762C, M-1762G, M-1762K	17T183
M-2165B, M-2165M	21T24
C-2166B, C-2166M	21T25
C-2167B, C-2167M	21T26
C-2163B, C-2163M	21T27
M-2171E, M-2172C, M-2172G	21T193
M-2173A, M-2173C, M-2173G	
M-2173K	21T193C

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, thru the small hole in the cabinet above and slightly to the left of the channel selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

For picture tube safety glass cleaning, it is necessary to remove chassis. (See disassembly instructions).

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator, it is necessary to remove the rear cover and supply power to the set. Adjustment is located on top of chassis. Set the horizontal hold control at the center of its range and adjust the horizontal frequency slug (B1) until picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the buzz control (R7) located on top of the chassis for maximum volume and minimum buzz.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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RAYTHEON MODELS C-2163B, M, C-2166B, M, C-2167B, M,
M-1761E, M-1762A, C, G, K, M-2165B, M, M-2171E,
M-2172C, G, M-2173A, C, G, K (Ch. 17T183, 21T24,
21T25, 21T26, 21T27, 21T93, C)

5. Lift top half of

5. Lift top half of

UNITED STATES DEPARTMENT OF AGRICULTURE

such an adjustment

may be accomplished
and fine tuning is

lightly to the left of

PICTURE TUBE SAFETY

on picture tube safe

remove class -- ☒

FIGURE 10.

see disassembly line

SERVICE ADJUSTMENT

ee tube placement

8

a listing of any available

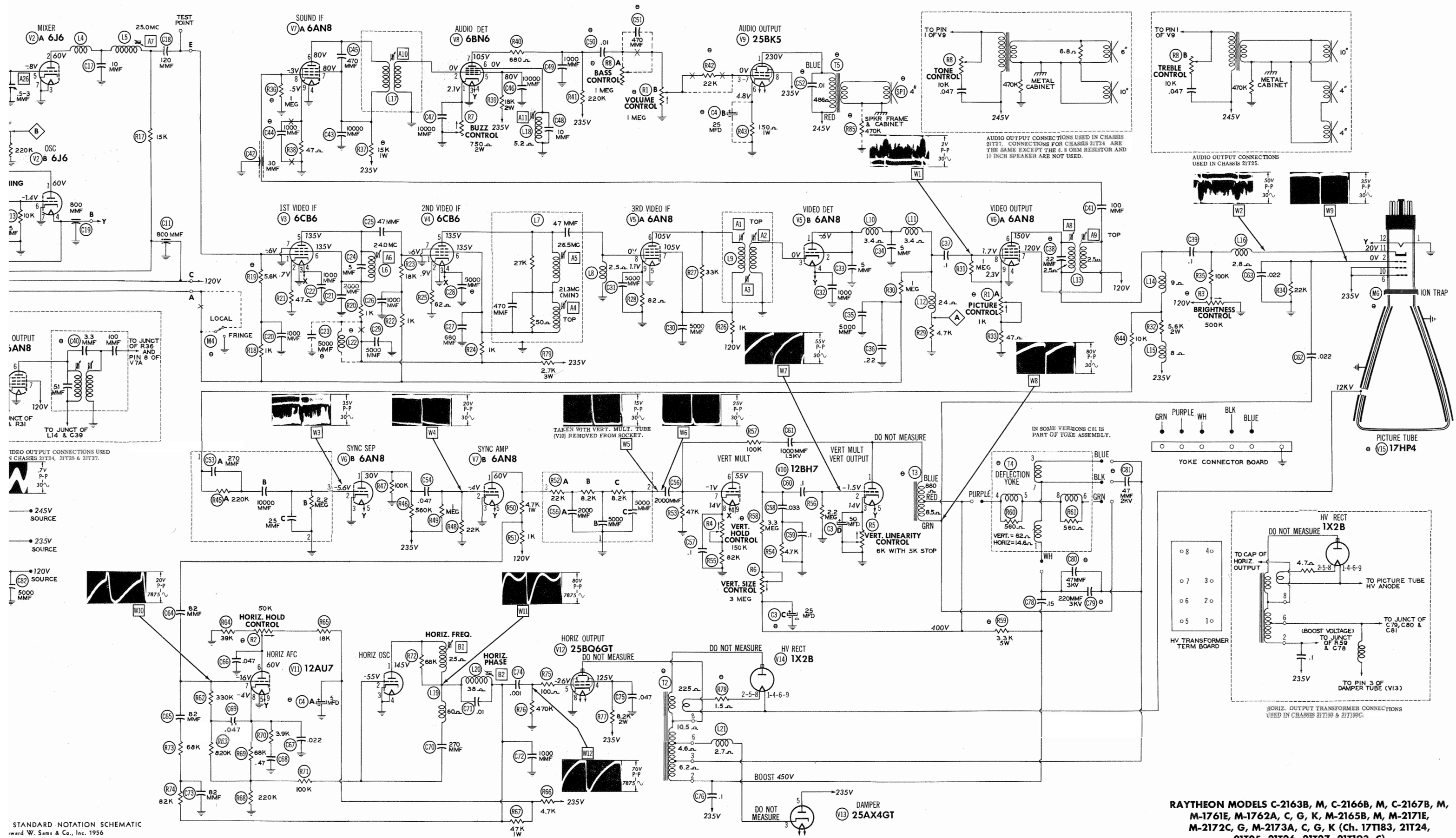
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by the manufacturers of

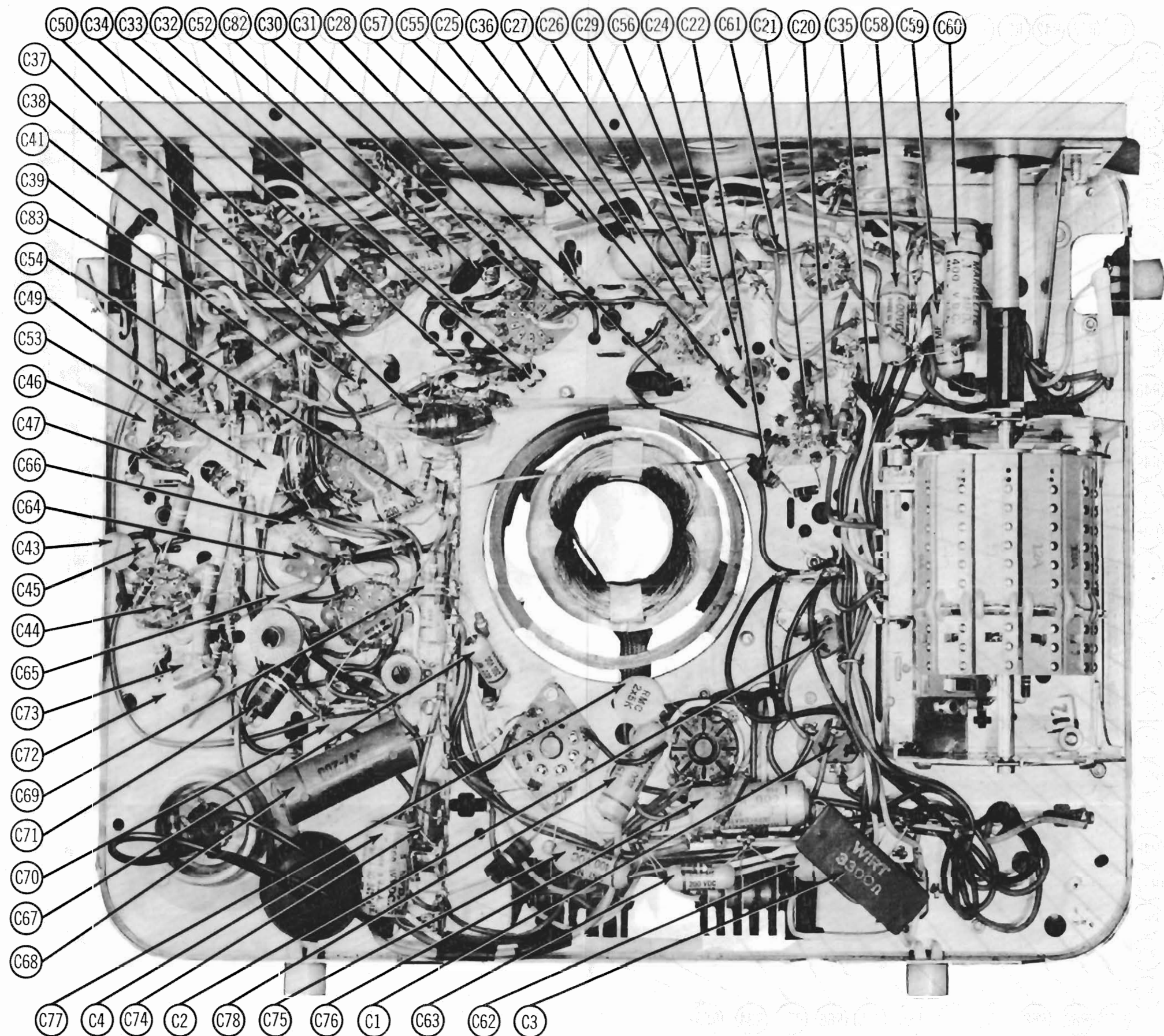
production or use, which



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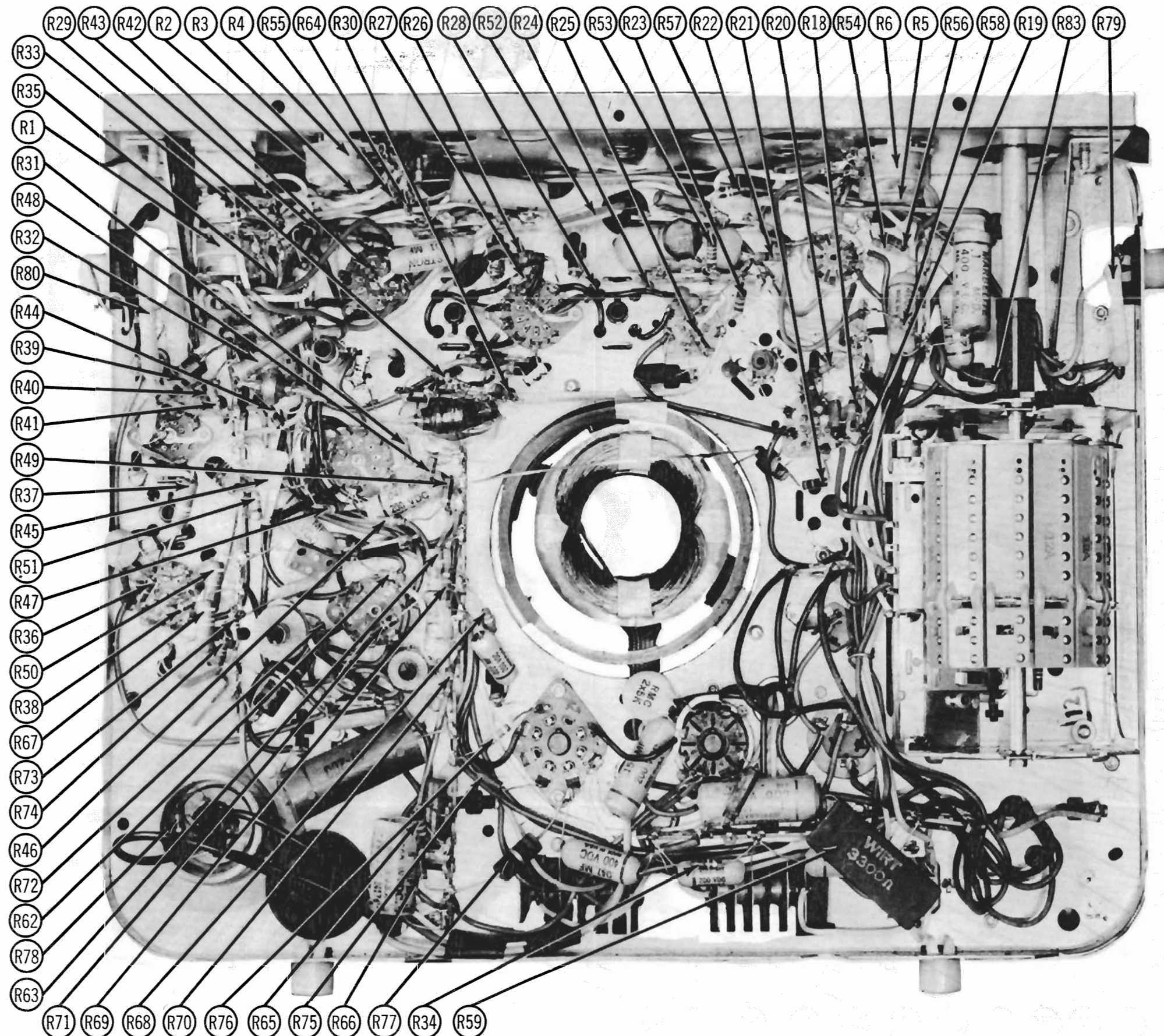


RAYTHEON MODELS C-2163B, M, C-2166B, M, C-2167B, M, M-1761E, M-1762A, C, G, K, M-2165B, M, M-2171E, M-2172C, G, M-2173A, C, G, K (Ch. 17T183, 21T24, 21T25, 21T26, 21T27, 21T193, C)



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

RATHENON MODELS C-2163B, M, C-2166B, M, C-2167B, M, M-1761E, M-1762A, C, G, K, M-2165B, M, M-2171E, M-2172C, G, M-2173A, C, G, K (Ch. 177183, 21724, 21725, 21726, 21727, 217193, C)



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

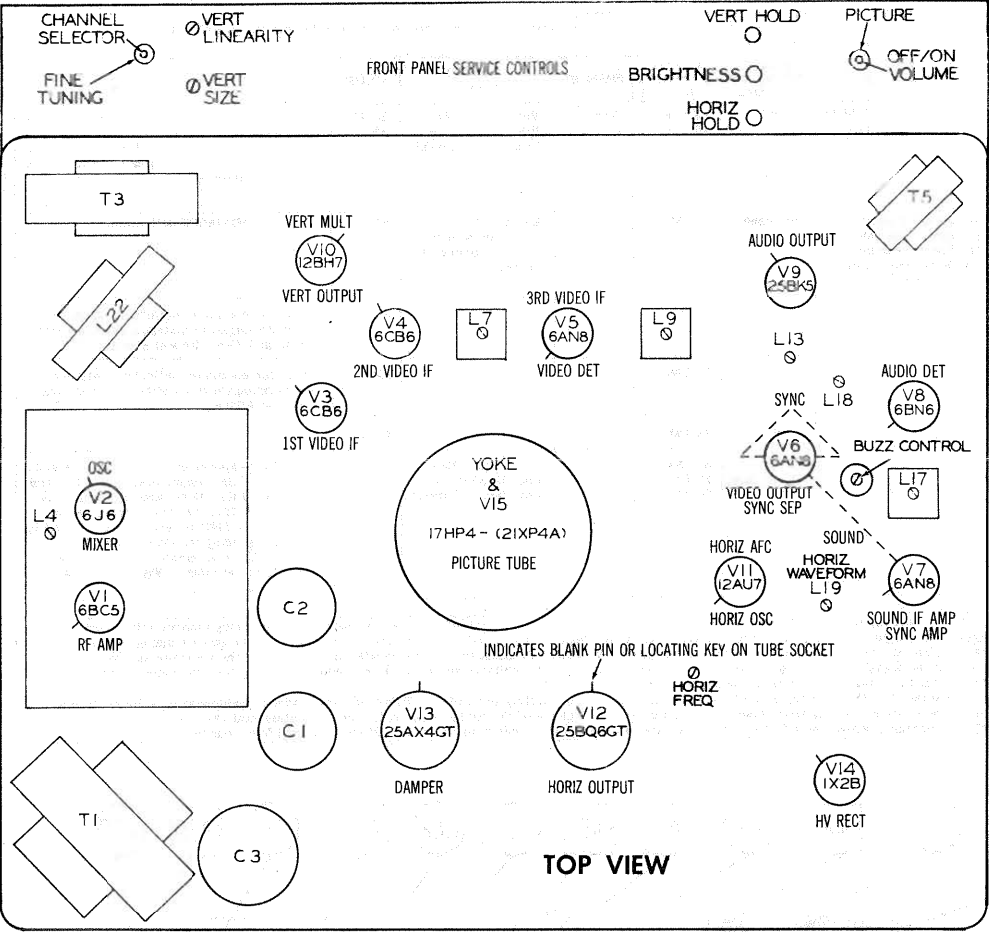
RAYTHEON MODELS C-2163B, M, C-2166B, M, C-2167B, M, M-1761E,
M-1762A, C, G, K, M-2165B, M, M-2171E, M-2172C, G, M-2173A, C,
G, K (Ch. 177183, 211724, 211725, 211726, 211727, 211793, C)

RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BC5	1Meg	0Ω	0Ω	.1Ω	†2.5KΩ	†4.7KΩ	0Ω		
V 2	6J6	†18KΩ	†18KΩ	0Ω	.1Ω	220KΩ	10KΩ	0Ω		
V 3	6CB6	1Meg	47Ω	0Ω	.1Ω	†3.7KΩ	†3.7KΩ	0Ω		
V 4	6CB6	1Meg	62Ω	0Ω	.1Ω	†3.7KΩ	†3.7KΩ	0Ω		
V 5	6AN8	4.7KΩ	4.7KΩ	.2Ω	.1Ω	0Ω	†3.5KΩ	2.5Ω	82Ω	
V 6	6AN8	†150KΩ	2.2Meg	0Ω	0Ω	.1Ω	†5.6KΩ	†2.5KΩ	1Meg	120Ω
V 7	6AN8	†8.2KΩ	22KΩ	0Ω	0Ω	.1Ω	†15KΩ	†15KΩ	1Meg	47Ω
V 8	6BN6	260Ω	.3Ω	0Ω	.1Ω	†18KΩ	5.2Ω	†220KΩ		
V 9	25BK5	†500Ω	TP	400KΩ	■11Ω	■0Ω	150Ω	400KΩ	†40Ω	TP
V 10	12BH7	■4.1KΩ	2.2Meg	850Ω	.1Ω	.1Ω	■4Meg	47KΩ	135KΩ	2.6Ω
V 11	12AU7	†50KΩ	320KΩ	0Ω	0Ω	0Ω	†25KΩ	1.4Meg	300KΩ	.1Ω
V 12	25BQ6GT	NC	■21Ω	TP	†8.2KΩ	470KΩ	NC	■11Ω	0Ω	TOP CAP ■13Ω
V 13	25AX4GT	TP	NC	700KΩ	NC	†40Ω	NC	■21Ω	■28Ω	
V 14	1X2B		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ■238Ω
V 15	17HP4	0Ω	22KΩ	PIN 6 †40Ω	PIN 10 †40Ω	PIN 11 †200KΩ	PIN 12 .1Ω			

†MEASURED FROM OUTPUT OF M2.
■MEASURED FROM PIN 3 OF V13.
■MEASURED FROM PIN 5 OF V9.
TP-TIE POINT.
NC-NO CONNECTION.

TUBE PLACEMENT CHART



TOP VIEW

TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

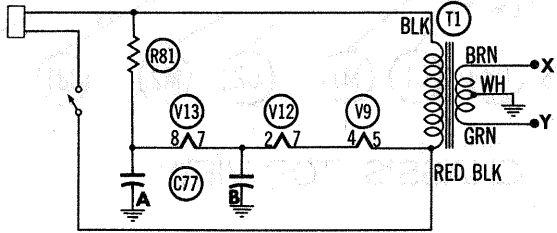
POWER SUPPLY FAILURE
No raster, no sound - Selenium Rectifiers (M1 & M2)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V15
Has pic, no sound - V7, V8, V9

SYNC FAILURE
No vert. sync - V7, V10
No horiz. sync - V7, V11
No vert. or horiz. sync - V6, V7

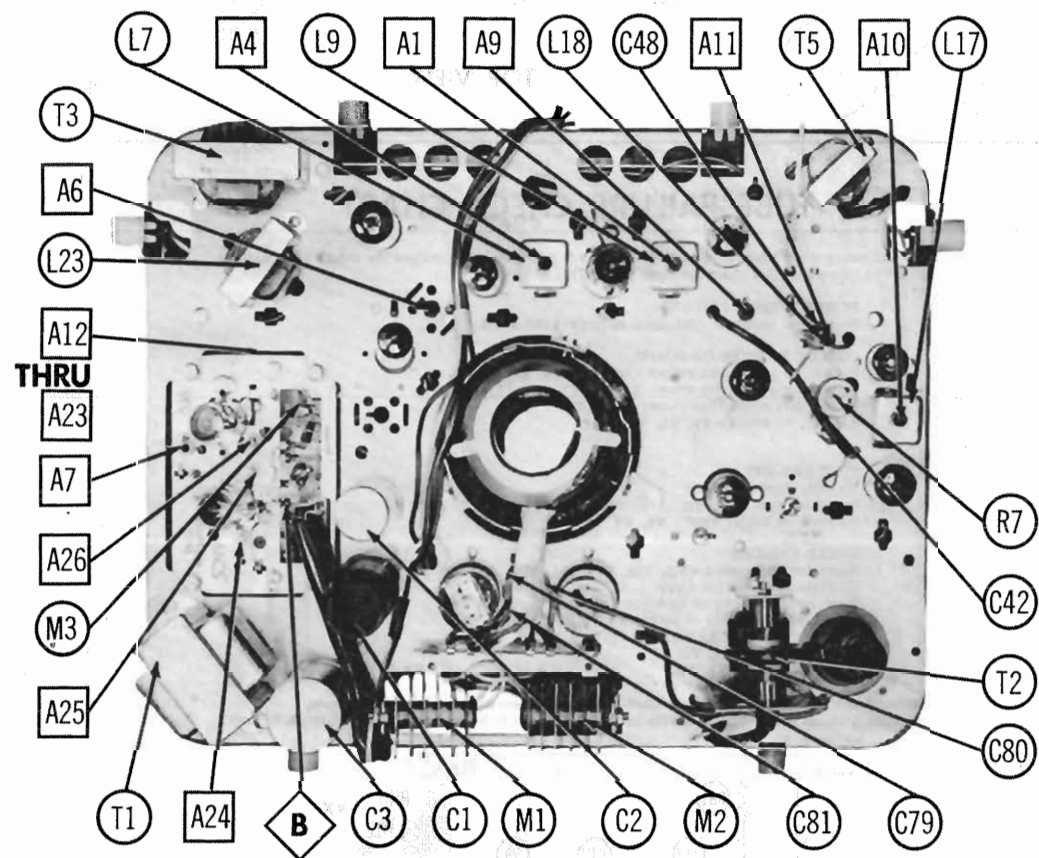
SWEEP FAILURE
No raster, has sound - V11, V12, V13, V14, V15
No vertical deflection - V10
Poor vert. linearity or foldover - V10
Poor horiz. linearity or foldover - V11, V12, V13
Narrow picture - V11, V12, V13, V14, M1, M2
Vert. off freq. - V7, V10
Horiz. off freq. - V7, V11

Note: Since this receiver employs tubes used in a series-parallel filament network, an open filament in any tube in series may cause the set to be inoperative. (See Circuit Below).



RAYTHEON MODELS C-2163B, M, C-2166B, M, C-2167B, M, M-1761E, M-1762A, C, G, K, M-2165B, M, M-2171E, M-2172C, G, M-2173A, C, G, K (Ch. 17T183, 21T24, 21T25, 21T26, 21T27, 21T193, C)

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT							
Use an isolation transformer to protect the test equipment. The high voltage lead should be securely taped and kept away from chassis. Do not remove the horizontal oscillator tube (V11) to disable the high voltage.							
VIDEO IF ALIGNMENT							
Remove the converter tube (V2) and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications. Connect a .001MFD across the vertical input terminals of oscilloscope. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. Use shielded short leads to prevent regeneration.							
DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1. .001MFD	High side to pin 8 (grid) of 6AN8 (V5A). Low side to chassis.	25MC (10MC Swp)	23.9MC 26.3MC	Any	Vert. Amp. thru 10KΩ to point A. Low side to chassis.	A1, A2, A3	Connect a short jumper from pin 5 (plate) to pin 6 (screen) of 6CB6 (V4). Adjust for response curve similar to Fig. 1 with markers at 90%. A3 is a coupling rod and affects bandwidth. Remove short from pin 5 to pin 6 of V4.
2. Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	Not used	21.3MC (Unmod.)	"	Use VTVM. DC probe to point A. Common to chassis.	A4	Adjust for MINIMUM deflection.
3. "	"	"	26.5MC	"	"	A5	Adjust for maximum deflection. Attenuate generator output to maintain not more than 2 volts at VTVM. Repeat step 2.
4. "	"	"	24.0MC	"	"	A6	Adjust for maximum deflection. Attenuate generator output to maintain not more than 2 volts at VTVM.
5. "	"	"	25.0MC	"	"	A7	"
6. "	"	25MC (10MC Swp)	21.3MC 23.8MC 26.25MC	"	Vert. Amp. thru 10KΩ to point A. Low side to chassis.		Check for response curve similar to Fig. 2. Rock A7 for flat-topped response. Increase sweep generator output and use high scope gain to view 22.25MC trap region. Adjust A4 so that 21.3MC occurs at peak of pop-up portion preceding trap notch. 22.25MC should fall in trap notch. If response obtained is not similar to Fig. 2., repeat step 1 thru 6.
SOUND IF ALIGNMENT							
Remove the dummy converter tube and replace the original 6J6 in its socket. Tune in a TV signal and adjust the fine tuning control until sound bars just appear in the picture. Adjust A8 fully counter clockwise, then clockwise until the horizontal scanning lines are smooth and continuous. Readjust the fine tuning control for clearest picture and best sound. Insert an attenuator in series with the antenna and the receiver antenna terminals so that the signal strength may be varied from weak to strong. If a suitable attenuator is not available, stray feed the signal to the receiver by placing the antenna lead-in near the antenna terminals. Reduce the signal input to the receiver so that the signal falls below the limiting level of the 6BN6 (audio-detector) as evidenced by a "hiss" in the sound. Adjust the secondary of the sound take-off transformer (A9), the sound IF transformer (A10), the quadrature coil (A11), and the buzz control (R7) for maximum sound and minimum buzz. If hiss disappears while adjusting, increase attenuation until hiss reappears.							



CHASSIS TOP VIEW

ALIGNMENT INSTRUCTIONS

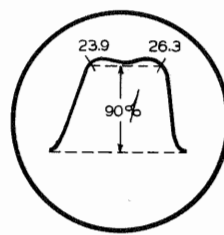


FIG. 1

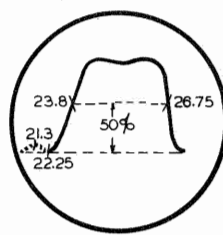


FIG. 2

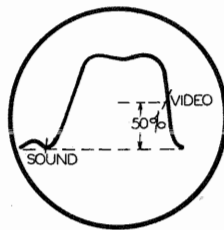


FIG. 3

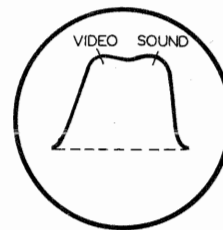


FIG. 4

OSCILLATOR ALIGNMENT

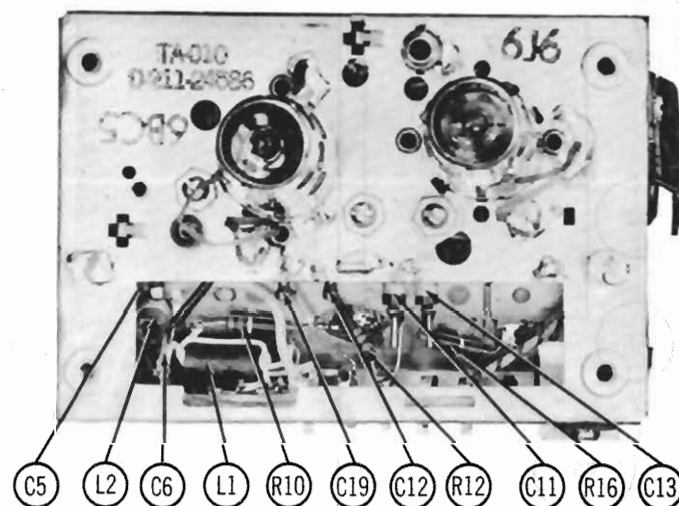
The channel oscillator adjustment screws are reached through a hole just above and slightly to the left of the fine tuning shaft. The correct oscillator adjustment screw is accessible thru this hole as the channel switch is turned to each channel. Connect the positive lead of a 1.5 volt bias battery to the tuner AGC. Connect the negative lead to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.
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
7. Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	195MC (10MC Swp)	193.25MC 197.75MC	10	Vert. Amp. thru 10KΩ to point A. Low side to chassis.	A12	Adjust to place sound marker in trap notch as in Fig. 3. Use high scope gain and increase sweep generator output to view trap region. Video marker should fall at 50% on response curve.
		213MC (10MC Swp)	211.25MC 215.75MC	13		A13	
		207MC (10MC Swp)	205.25MC 209.75MC	12		A14	
		201MC (10MC Swp)	199.25MC 203.75MC	11		A15	
		189MC (10MC Swp)	187.25MC 191.75MC	9		A16	
		183MC (10MC Swp)	181.25MC 185.75MC	8		A17	
		177MC (10MC Swp)	175.25MC 179.75MC	7		A18	
		85MC (10MC Swp)	83.25MC 87.75MC	6		A19	
		79MC (10MC Swp)	77.25MC 81.75MC	5		A20	
		69MC (10MC Swp)	67.25MC 71.75MC	4		A21	
		63MC (10MC Swp)	61.25MC 65.75MC	3		A22	
		57MC (10MC Swp)	55.25MC 59.75MC	2		A23	

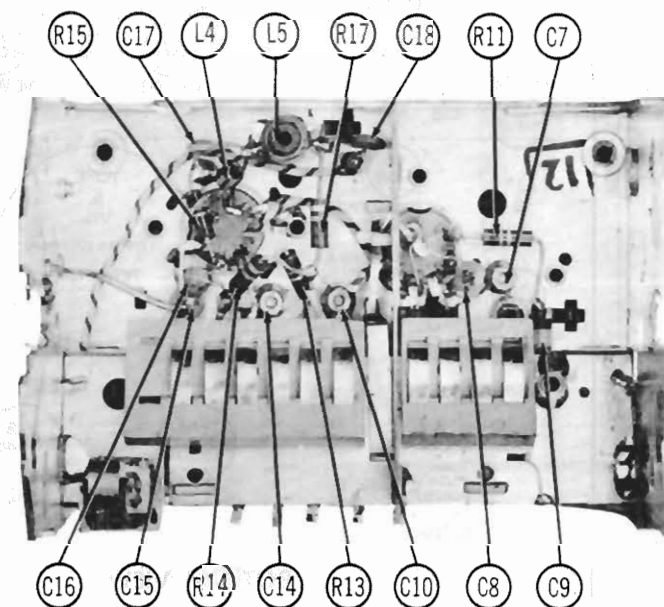
RF AND MIXER ALIGNMENT

Leave the bias battery connected as under "Oscillator 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 50Ω.

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8. Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	195MC (10MC Swp)	193.25MC 197.75MC	10	Vert. Amp. thru 10KΩ to point B. Low side to chassis.	A24, A25, A26	Adjust for response curve similar to Fig. 4 with markers above 90%.
9. "	"	69MC (10MC Swp)	67.25MC 71.75MC	4	"		Check for response curve similar to Fig. 4. If markers fall below 70% on any channel, make slight compromise adjustments of A24, A25 and A26 with channel switch set to that channel. Recheck all other channels to see that they have not been seriously affected.
		213MC (10MC Swp)	211.25MC 215.75MC	13			
		207MC (10MC Swp)	205.25MC 209.75MC	12			
		201MC (10MC Swp)	199.25MC 203.75MC	11			
		189MC (10MC Swp)	187.25MC 191.75MC	9			
		183MC (10MC Swp)	181.25MC 185.75MC	8			
		177MC (10MC Swp)	175.25MC 179.75MC	7			
		85MC (10MC Swp)	83.25MC 87.75MC	6			
		79MC (10MC Swp)	77.25MC 81.75MC	5			
		69MC (10MC Swp)	67.25MC 71.75MC	4			
		63MC (10MC Swp)	61.25MC 65.75MC	3			
		57MC (10MC Swp)	55.25MC 59.75MC	2			



RF TUNER TOP VIEW



RF TUNER BOTTOM VIEW

RAYTHEON MODELS C-2163B, M, C-2166B, M, C-2167B, M, M-1761E, M-1762A, C, G, K, M-2165B, M, M-2171E, M-2172C, G, M-2173A, C, G, K (Ch. 17T183, 21T24, 21T25, 21T26, 21T27, 21T193, C)

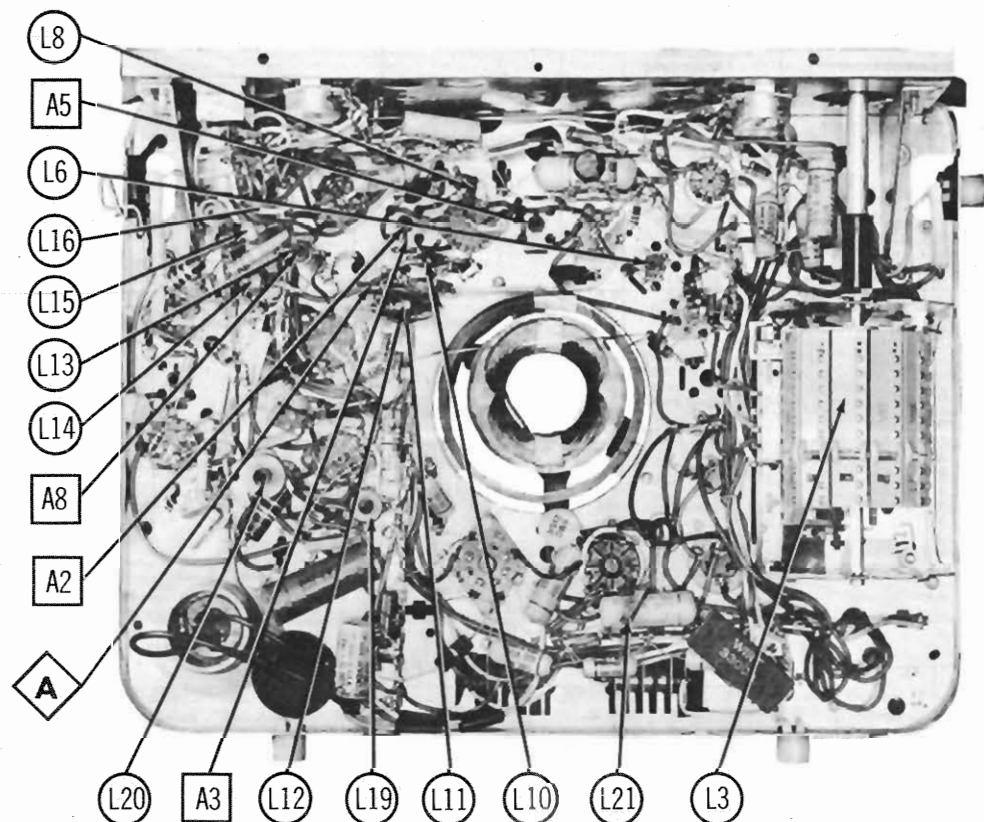
PARTS LIST AND DESCRIPTIONS (Continued)

SELENIUM RECTIFIER

ITEM No.	RATING		REPLACEMENT DATA					NOTES
	CURRENT	RAYTHEON PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKS TARZIAN PART No.	
M1	.260ADC	21J23840	1236A	MR-300	6S300	6Q4	300	① Used in 21" Models.
M2	.260ADC	21J23840 21J20097 ① 21J20097 ①	1236A	MR-300	6S300	6Q4	300	

MISCELLANEOUS

ITEM No.	PART NAME	RAYTHEON PART No.	NOTES
M3	Tuner	D-211-24586	VHF-Chassis 17T183, 21T193, 21T26
	Tuner		VHF-Chassis 21T24, 21T25, & 21T27
	Tuner		VHF-Chassis 21T193C
M4	Switch	201-24480	Local-Fringe-Used in chassis 21T24, 21T27, 21T25 only.
M5	Centering Device	16M-24493	Chassis 17T183, 21T193, 21T193C
	Centering Device	16M-23770	Chassis 21T26, 21T24, 21T25, 21T27
M6	Ion Trap	16M-19705	Chassis 17T183, 21T193, 21T193C
	Ion Trap	16M-19706	Chassis 21T26, 21T24, 21T25, 21T27
M7	Correction Magnet	16M-22607	Models M-2165M, M-2165B, C-2166M, C-2166B
	Correction Magnet	16M-21526	Models C-2163M, C-2163B
	Cabinet	2B-24661-A168	Top-Model M-1761E
	Cabinet	2B-24661-A145	Top-Model M-1762C
	Cabinet	2B-24661-A147	Top-Model M-1762G
	Cabinet	2B-24661-A148	Top-Model M-1762K
	Cabinet	2B-24661-A169	Top-Model M-1762A
	Cabinet	2B-24662-A168	Top-Model M-2171E
	Cabinet	2B-24662-A145	Top-Models M-2172C, M-2173C
	Cabinet	2B-24662-A147	Top-Models M-2172G, M-2173G
	Cabinet	2B-24662-A169	Top-Model M-2173A
	Cabinet	2B-24662-A148	Top-Model M-2173K
	Cabinet	2B-24659-A168	Bottom-Model M-1761E
	Cabinet	2B-24659-A145	Bottom-Model M-1762C
	Cabinet	2B-24659-A147	Bottom-Model M-1762G
	Cabinet	2B-24659-A148	Bottom-Model M-1762K
	Cabinet	2B-24659-A169	Bottom-Model M-1762A
	Cabinet	2B-24660-A168	Bottom-Model M-2171E
	Cabinet	2B-24660-A145	Bottom-Models M-2172C, M-2173C
	Cabinet	2B-24660-A147	Bottom-Models M-2172G, M-2173G
	Cabinet	2B-24660-A169	Bottom-Model M-2173A
	Cabinet	2B-24660-A148	Bottom-Model M-2173K
	Cabinet	24D-24093	Model C-2163M
	Cabinet	24D-24108	Model C-2163B
	Cabinet	24D-24150	Model M-2165M
	Cabinet	24D-24151	Model M-2165B
	Cabinet	24D-24143	Model C-2166M
	Cabinet	24D-24152	Model C-2166B
	Cabinet	24D-24606	Model C-2167M
	Cabinet	24D-24607	Model C-2167B



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR & ALIGN. IDENTIFICATION

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

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		RAYTHEON PART No.	STANDARD REPLACEMENT		
V1	RF Amplifier	6BC5	6BC5	7BD	
V2	Mixer-Osc.	6J6	6J6	7BF	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.				
V6	Video Detector	6AN8	6AN8	9DA	
	Video Output-Sync Separator	6AN8	6AN8	9DA	
V7	Sound IF Amp.-Sync Amplifier	6AN8	6AN8	9DA	
V8	Audio Detector	6BN6	6BN6	7DF	
V9	Audio Output	25BK5	25BK5	9BQ	
V10	Vert. Mult.-Vert. Output	12BH7	12BH7	9A	
V11	Horiz. AFC-Horiz. Osc.	12AU7	12AU7	9A	
V12	Horiz. Output	25BQ6GT	25BQ6GT	6AM	
V13	Damper	25AX4GT	25AX4GT	4CG	
V14	HV Rectifier	1X2B	1X2B	9Y	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA					RETMA BASE TYPE	NOTES
	RAYTHEON PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.		
V15	17HP4	17HP4/17RP4	17RP4/17HP4	17HP4/17RP4	17HP4/17RP4	12L	① Aluminized ② Silver screen
	21YP4A ①	21YP4A ①	21YP4A ①	17HP4B ② 21YP4A ②	21YP4A ①	12L	
	21A VP4	21YP4	21YP4	21YP4	21YP4	12L	
	21A VP4A ①	21A VP4A ①	21YP4	21A VP4A ②	21A VP4A ①	12L	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	RAYTHEON PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1	150	150	8C-22464	FP117	TM-150-150	T-050	
C2	150	150	8C-22463	FP117	TM-150-150	T-050	
C3A	100	300	8C-23689		TM-4128	T-537	
B	10	300				D-375	
C	25	450					Note 1
D	50	50					
C4A	5	300	8C-24193	TC60	TD-8-350	FM-3508	Note 2
B	25	25		TC26	TD-25-25	FM-0225	Note 2

Note 1. In chassis 21T193 and 21T193C, C3C is a single unit 20MFD @ 550V (part #8C-25094) (3 Section C3 part #8C-22523).
Note 2. C4B is used only in chassis 21T24, 21T25 and 21T27 (single unit part #2M-24174).

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.	RAYTHEON PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	
C5	1.5			TCZ-IR5	NP0A-IR5	ZT-5515	
C6	8.2		105S-25231				
C7	5-3		105S-25232	829-3	3115-01-0R5	CT565A	
C8	120		100S-24336	DD-121	811-121	UC-5312	
C9	800		105S-25233				
C10	5-3		105S-25232	829-3	3115-01-0R5	CT565A	
C11	800		105S-25233				
C12	800		105S-25233				
C13	800		105S-25233				
C14	5-3		105S-25232	829-3	3115-01-0R5	CT565A	
C15	5		100S-24339				
C16	10		105S-25234	TCN-10	N750K-100	NT-541	
C17	10		100S-24338	TCZ-10	NP0K-100	ZT-541	
C18	120		100S-24336	DD-121	811-121	UC-5312	
C19	800		105S-25233				
C20	1000		8G-13201	D6-102	GP2L-102	UC-521	
C21	2000		8G-19522	D6-202	GP2-333-202	UC-522	
C22	1000		8G-13201	DD-102	801-001	DC-521	
C23	5000		8G-13962	DD-503	811-005	DC-525	
C24	5		8G-12166	TCZ-5	NP0A-050	ZT-555	
C25	47		8G-19731	DD-470	831-470	UC-544	
C26	1000		8G-13201	DD-102	801-001	DC-521	
C27	680		8G-21105	D6-681	GP2K-681	UC-5304	
C28	5000		8G-13962	DD-502	811-005	DC-525	
C29	5000		8G-13962	DD-502	811-005	DC-525	
C30	5000		8G-13962	DD-502	811-005	DC-525	
C31	5000		8G-13962	DD-502	811-005	DC-525	
C32	1000		8G-13201	DD-102	801-001	DC-521	
C33	5		8G-12166	TCZ-5	NP0A-050	ZT-555	
C34	5		8G-12166	TCZ-5	NP0A-050	ZT-555	
C35	5000		8G-13962	DD-502	811-005	DC-525	
C36	.22	200	8K-23086			PT4022	
C37	.1	200	8K-23084	DF-104		PT401	
C38	22		8G-11892	TCN-22	N750K-220	NT-5422	
C39	.1	400	8K-23095	DF-104		PT401	
C40	3.3		8L-23551	TCZ-3R3	NP0A-3R3	ZT-5533	
C41	100		8G-12759	D6-101	GP1K-101	UC-531	
C42	30		14B-23772				
C43	10000		8G-20269	DD-103	811-01	DC-511	
C44	1000		8G-13201	DD-102	801-001	DC-521	
C45	470	500	8F2-121	D6-471	811-471	MCB245	
C46	10000		8G-20269	DD-103	811-01	DC-511	
C47	10000		8G-20269	DD-103	811-01	DC-511	
C48	10		8G-11789	TCZ-10	NP0K-100	ZT-541	
C49	1000		8G-13201	DD-102	801-001	DC-521	
C50	.01	400	8K-23091	D6-103	GP2-333-103	PT411	
C51	470	500	8F3-121	D6-471	GP2K-471	MC245	

RAYTHEON MODELS C-2163B, M, C-2166B, M, C-2167B, M, M-1761E, M-1762A, C, G, K, M-2165B, M, M-2171E, M-2172C, G, M-2173A, C, G, K (Ch. 17T183, 21T24, 21T25, 21T26, 21T27, 21T193, C)

CAPACITORS (cont)

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	RAYTHEON PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	
C52	.01	600	8K-23102	D6-103	GP2-333-103	PT611	Note 7
C53A	270				GP2K-271	UC-5327	
B	10000		117A-24212	1PC-242	811-01	DC-511	
C	25				GP1K-250	UC-5425	
C54	.047	200	8K-23083	DF-503		PT4147	
C55A	2000					DC-522	
B	5000		117A-22376	1PC-100	1405-01	DC-525	
C	5000					DC-525	
C56	2000		8G-19522	D6-202	GP2-333-202	UC-342	
C57	.1	200	8K-23084	DF-104		PT401	
C58	.033	400	8K-23816	DF-303		PT6133	
C59	.1	200	8K-23084	DF-104		PT401	
C60	.1	400	8K-23095	DF-104		PT401	
C61	1000	1500	8G-24991	DD30-102	IR5KV-102	MCK210	
C62	.022	600	8K-23104	DF-203	817-02	PT6122	
C63	.022	200	8K-23082	DF-203	817-02	PT4122	
C64	.02	500	8F3-112	D6-820	801-820		
C65	.02	500	8F3-112	D6-820	801-820		
C66	.047	400	8K-23094	DF-503		PT4147	
C67	.022	200	8K-23082	DF-203	817-02	PT4122	
C68	.47	250	8K-23087			PT4047	
C69	.047	200	8K-23083	DF-503		PT4147	
C70	270	500	8F5-235	TCZ-270	NP0-335-271	MCE241	
C71	.01	600	8M-24439				
C72	1000	500	8F7-125			MCB255	
C73	.02	500	8F3-112	D6-820	801-820		
C74	.001	600	8K-23099	D6-102	GP2L-102	PT621	
C75	.047	400	8K-23094	DF-503		PT4147	
C76	.1	600	8K-23104	DF-104		PT601	
C77A	5000		8G-23190	DD2-502	811-005	DC-525	
B	5000				811-005	DC-525	
C78	.15	200	8K-23085			PT4015	
C79	220	3000	8G-23952	DD30-221	3KV-221	DC30322	Note 8
C80	47	3000	8G-24028	DD30-470	3KV-470	DC30447	Note 8
C81	47	3000	8G-23645	DD30-470	3KV-470	DC30447	Note 9
C82	5000		8G-13962	DD-502	811-005	DC-525	
C83	5000		8G-13962	DD-502	811-005	DC-525	Note 10

Note 3. Some versions use 1000MMF in this application (part #8G-13201).
 Note 4. Chassis 21T24, 21T25 and 21T27 use 5MMF in this application.
 Note 5. Not used in chassis 21T24, 21T25 and 21T27.
 Note 6. Chassis 21T25 and 21T27 use .047MFD in this application (part #8K-23094).
 Note 7. Chassis 21T24, 21T25 and 21T27 use .047MFD in this application (part #8K-23105).
 Note 8. Chassis 21T24, 21T25 and 21T27 use 22MMF in this application (part #8G-24109).
 Note 9. Chassis 21T193 and 21T193C use 68MMF in this application (part #8G-24709).
 Note 10. Chassis 21T24, 21T25 and 21T27 use .01MFD in this application (part #8K-23091).
 Note 11. Used only in chassis 21T24, 21T25 and 21T27.
 Note 12. Used only in chassis 21T25.
 † Items C53A, C53B, C53C, R45A and R45B are combined in one unit.
 ‡ Items C55A, C55B, C55C, R52A, R52B and R52C are combined in one unit.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	RAYTHEON PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	10000		10A-24698	F1-5	RTV-527	QJ-794*	UF13R	Picture (Panel)
R1B	1M			R2-32			UR16A	Volume (Rear) Attach to R1A.
R1C	Switch			KB-1			US-26	Attach to R1B.
R1A	10000		10A-23714	F1-4	RTV-486	QJ-734*	UF13L	Picture (Panel) (See Note 1)
R1B	1M			R2-52			UR16A	Volume (Rear) Attach to R1A.
R1C	Switch			KB-1			US-26	Attach to R1B.
R2A	50K		10B-23694	AB-31	A47-50K-S	QJ-123	TA54L	Horizontal Hold
R2B	50K		10B-24260	AK-4	KSS-3	Not Req.	Not Req.	Attach to R2A.
R3A	500K		10B-23695	AB-59	A47-500K-S	QJ-133	TA55L	Horizontal Hold (See Note 5)
R3B	500K		10B-24260	AK-4	KSS-3	Not Req.	Not Req.	Attach to R3A.
R3A	500K		10B-23695	AB-59	A47-500K-S	QJ-133	TA55L	Brightness
R3B	500K		10B-24260	AK-4	KSS-3	Not Req.	Not Req.	Attach to R3A.
R4A	150K		10B-23693-1	AB-43	A47-150K-S	QJ-328	TA164L	Vertical Hold
R4B	150K		10B-24258-1	AK-4	KSS-3	Not Req.	Not Req.	Attach to R4A.
R5A	60000		10B-23407	AB-10**	A47-5000-S**	QJ-114**	TA53L**	Vertical Linearity (Stop at 50000)
R6A	3M		10B-23696	AK-1	FKS-1/4	RQ	Not Req.	Attach to R5A.
R6B	3M		10B-23696	AK-1	A47-3Meg-S	QJ-140	TA36L	Vertical Size
R7	7500		10B-23657	F1-55	39-750	QJ-637†	UF16L	Buzz (Wire Wound)
R8A	1M		10B-24164	R2-23			UR14L	Base (Panel) (See Note 2)
R8B	10K		10B-24261	1A-59				Treble (Rear) Attach to 38A
R9A	150K		10B-24142-1	F1-32				Tone (See Note 3)
R9B	50K			R2-29				Vertical Hold (See Note 1)

*CONCENTRIC EQUIVALENT; K-5 KIT, BASE ELEMENTS AND SHAFTS; B17-108, P1-020 (Panel)
 B13-137, R2-103 (Rear)
 76-1 Switch

*Universal Replacement (Mallory Exact Duplicate Part No. UE66S).

†CONCENTRIC; K-6 KIT, BASE ELEMENTS AND SHAFTS; B17-108, P17-102 (Panel)
 B13-137, R2-115 (Rear)
 76-1 Switch

†Universal Replacement (Mallory Exact Duplicate Part No. UE66S).

**Connect a 10000 resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).

††CONCENTRIC EQUIVALENT; K-2 KIT, BASE ELEMENTS AND SHAFTS; B11-137, P17-109 (Panel)
 B11-116, R2-124 (Rear)

Note 1. Used in chassis 21T24, 21T25, and 21T27 only.

Note 2. Used in chassis 21T55 only.

Note 3. Used in chassis 21T24 and 21T27 only.

Note 4. Used in chassis 21T24, 21T25, 21T27 and 21T28.

Note 5. Used in chassis 21T26 only.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RAYTHEON PART No.	IRC PART No.	
R10	680K		9B1-96	BTS-680K	
R11	10K		9B1-74	BTS-47	
R12	22000		9B1-66	BTS-2200	
R13	10K		9B1-74	BTS-47	
R14	15K		9B1-74	BTS-47	
R15	10K		9B1-74	BTS-47	
R16	220K		9B1-27	BTS-220K	
R17	15K		9B1-74	BTS-47	
R18	10000		9B1-62	BTS-1000	
R19	56000		9B1-71	BTS-1000	Note 1
R20	10000		9B1-62	BTS-1000	

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RAYTHEON PART No.	IRC PART No.	
R32	56000	2	9B4-71	BTS-5600	
R33	47K		9B1-40	BTS-47	
R34	22K		9B1-78	BTS-22K	
R35	100K		9B1-88	BTS-100K	
R36	1M		9B1-96	BTS-1M	Note 2
R37	15K		9B2-75	BTA-15K	Note 3, 4
R38	47K		9B1-46	BTS-47	
R39	18K		9B4-77	BTA-18K	
R40	6800		9B1-60	BTS-680	
R41	220K		9B1-90	BTS-220K	
R42	22K		9B1-90	BTS-22K	
R43	150K		9B2-52	BTA-150	Note 5
R44	10K		9B1-74	BTS-10K	
R45A	220K		117A-24212		
R46	560K		9B1-95	BTS-560K	
R47	100K		9B1-86	BTS-100K	
R48	22K		9B1-78	BTS-22K	
R49	1M		9B1-98	BTA-4700	
R50	47000		9B2-70	BTS-47K	
R51	10000		9B1-62	BTS-1000	
R52A	22K		117A-22376		
R53	82000		9B1-82	BTS-82K	
R54	47000		9B1-70	BTS-47K	Note 5
R55	82K		9B1-85	BTS-82K	Note 9
R56	2.2M		9B1-102	BTS-220K	Note 10
R57	100K		9B1-86	BTS-100K	Note 11
R58	3.3M		9B1-104	BTS-330K	Note 12

Note 1. Some versions use a 12K 1W resistor in this application.
 Note 2. A 100K 1W resistor is used in chassis 21T24, 21T27 in this application.
 Note 3. Some versions use a 12K 1W resistor in this application.
 Note 4. A 33K 1W resistor is used in chassis 21T24, 21T27, 21T25 in this application.
 Note 5. Not used in some versions.
 Note 6. A 15000 5W (WW) resistor is used in chassis 21T193, 21T193C in this application.
 Note 7. A 4.7K 1W resistor is used in chassis 21T193, 21T193C in this application.
 Note 8. A 5.6K 5W fuse resistor is used in chassis 21T193, 21T193C in this application.
 Note 9. Used in chassis 21T193, 21T193C, 21T24, 21T25, 21T27 only.
 Note 10. Used in chassis 21T24, 21T25 only.
 Note 11. Used in chassis 21T25 only.
 † Items C53A, C53B, C53C, R45A, R45B are combined in one unit.
 ‡ Items C55A, C55B, C55C, R52A, R52B, R52C are combined in one unit.

TRANSFORMER (FILAMENT)

ITEM No.	RATING		REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	RAYTHEON PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Stancor PART No.
T1	115VAC			12D23699-3	F5526	P-2959		P-8130
	2.0A			12D23699-1				26F67

① Alternate filament transformer.
 ② Drill one new mounting hole.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA						
		RAYTHEON PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Ram PART No.	Stancor PART No.	Thordarson PART No.
T2	Horiz. Output Trans.	12E-23726-1			X126		FLY-80*	
T3	Vert. Output Trans.	12E-23726-1	Z1804	A-3037	222T1	V313	A-8123	26S62
		12C-19048-2	Z1804-5	A-3037	222T1	V313	A-8123	26S62
T4A	Yoke-Horiz. (8.5MH)	12E-23726-1	Z1804	A-3037	222T1	V313	A-8123	26S62
		201-24748	DF601	MDF-70	206D1	Y70F08	DY-8A	Y-5
B	Vert. (42MH)	201-24632	DF604	MDF-75	206D1	Y70F08	DY-15A	Y-12
		201-24056	DF601	MDF-70	206D1	Y70F08	DY-8A	Y-5
	Horiz. (25MH)	201-24183	DF601	MDF-70	206D1	Y70F08	DY-8A	Y-5
	Vert. (42MH)	201-24563-1						

① Used in chassis 17T183, 21T17, 21T24, & 21T25.
 ② Used in chassis 21T193 & 21T193C.
 ③ Used in chassis 17T183.
 ④ Used in chassis 21T27, 21T24, & 21T25.
 ⑤ Drill new mounting hole(s).
 ⑥ Used in chassis 17T183 and include R60 & R61.
 ⑦ Used in chassis 21T27.
 ⑧ Used in chassis 21T24 & 21T25.
 ⑨ Use original rear cover & centering device.
 ⑩ Use original horizontal yoke damping network.
 ⑪ Use original yoke damping network.
 ⑫ Inductance for all but 201-24632 yoke.
 ⑬ Inductance for 201-24632 yoke only.
 ⑭ Used in chassis 21T26.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
8				8		8	
6				6		6	
3				3		3	
2				2		2	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	RAYTHEON PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T5	6.4K	3.6	12C-23704-1	Z1113	A-3026	A-3878	22S46	S-7X	① Drill one new mounting hole. ② Used in chassis 21T24 and 21T26. ③ Used in chassis 21T25 and 21T27.
			12C-23704-2						
			12C-24170	Z1004	A-2931	A-3878	24S52	S-51X	

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA		NOTES
				RAYTHEON PART No.	QUAM PART No.	
SP1	4"	PM	3.60	18A24681 ①	4A07	① Used in Models M-1761E, M-1762A, M-1762C, M-1762G & M-1762K ② Used in Models C-2166M, C-2166B, C-2163M & C-2163B ③ Used in Models M-2171E, M-2172C, M-2172G, M-2173A, M-2173C, M-2173G, & M-2173K. ④ Used in Models M-2165M, M-2165B, C-2187M, & C2167B. ⑤ Used in Models C-2166M & C-2166B. ⑥ Used in Models C-2163M & C-2163B.
	4"	PM	3.60	18A24163 ②	4A07	
	5"	PM	3.60	18A24682 ③	5A07	
	6"	PM	3.60	18A21433 ④	6A1	
	10"	PM	3.60	18A21472 ⑤	10A31	
	10"	PM	3.60	18A21416 ⑥	10A31	