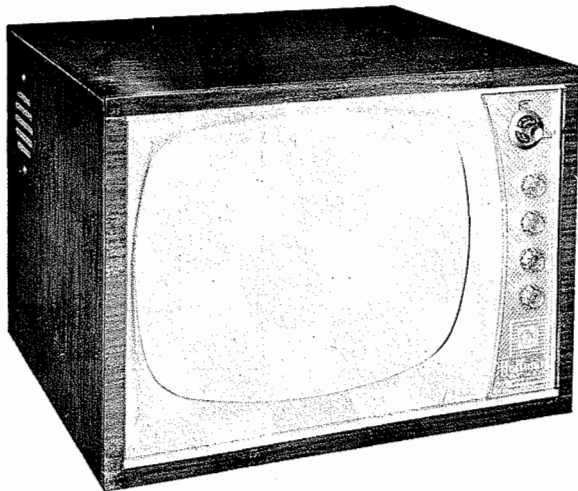


DISASSEMBLY INSTRUCTIONS

- CHASSIS REMOVAL**
 1. Remove 6 push-on type control knobs from front panel of cabinet.
 2. Remove 1 metal screw and loosen 7 wood screws. Remove rear cover.
 3. Place receiver on its side (speaker up).
 4. Remove 3 chassis bolts below chassis mounting board screen.
 5. Restore receiver to its normal upright position.
 6. Remove 4 wood screws from chassis rear (holding chassis to cabinet) wing nut bolt from top of tuner.
 7. Remove wing nut from yoke and remove yoke.
 8. Remove chassis.
 9. Remove 2 speaker nuts. Remove speaker.
- CABINET REMOVAL**
 1. Remove 6 push-on type control knobs from panel of cabinet.
 2. Remove 1 metal screw and loosen 7 wood screws. Remove rear cover.
 3. Place receiver on its side (speaker up).
 4. Disconnect speaker leads.
 5. Remove 6 bolts from bottom sides (3 on each side) and 2 wood screws from bottom front. Restore receiver to its normal upright position.
 6. Remove 4 wood screws from chassis rear (holding chassis to cabinet.).
 7. Slide cabinet to the front and off.
 8. Remove 2 speaker nuts. Remove speaker.



CHASSIS
303-17, U, 303-21, U, 306-21, B, U, BU,
307-21, 308-21, 309-21, U, U2, 309A-21, U,
U2, 310-21, C2, U, U2

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 the channel selector shaft.
- PICTURE TUBE SAFETY GLASS CLEANING**

To clean safety glass remove 3 wood screws holding metal strip at the top edge of the safety glass. Remove strip and safety glass. Use extreme caution when removing safety glass.
- 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.
- SPECIAL ADJUSTMENTS - Area Control Adjustment**

The area control (R5) is located on the rear panel of the chassis. Adjust R5 for MINIMUM snow in picture.
- HORIZONTAL OSCILLATOR FIELD ADJUSTMENT**

Adjustment of the horizontal oscillator circuit can be made from the rear panel of the chassis. Adjust the horizontal frequency slug of L23 until the picture synchronizes horizontally.
- SOUND IF DETECTOR BUZZ ADJUSTMENT**

To eliminate sound IF detector buzz, adjust the ratio detector secondary slug (A3) located on top of chassis.
- CENTERING**

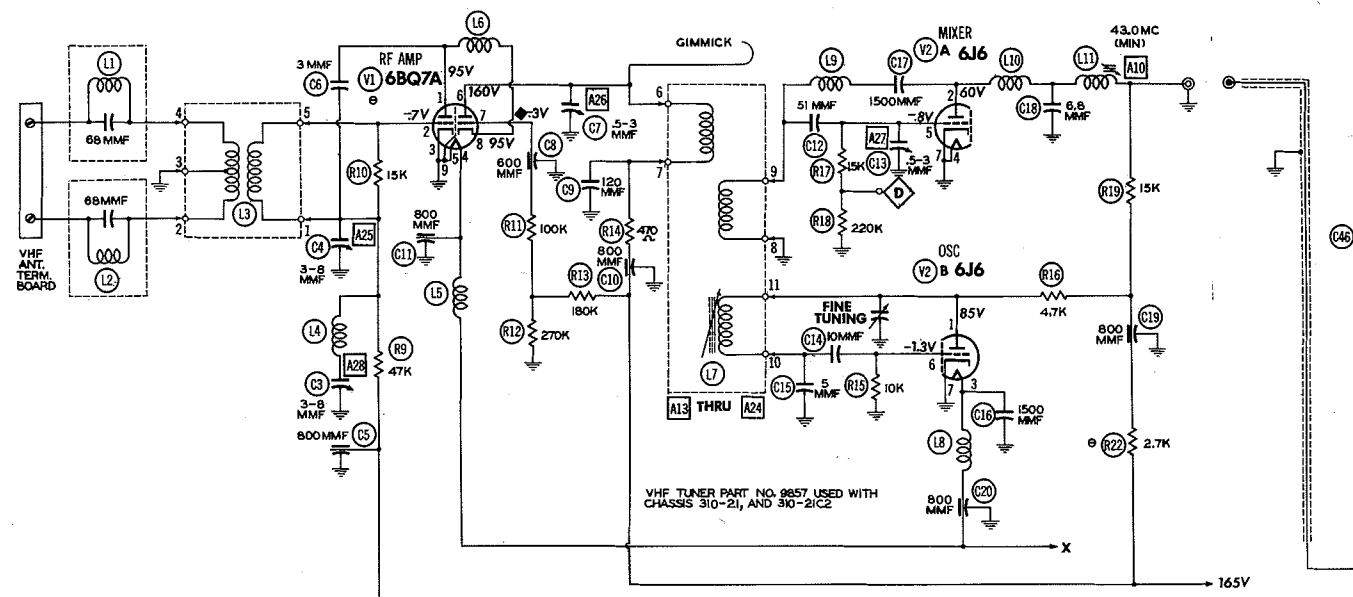
Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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

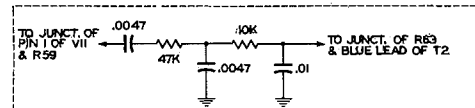
"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."

"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1956 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

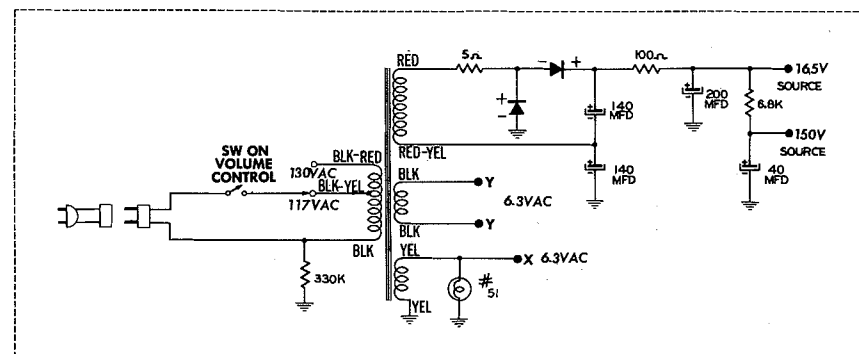
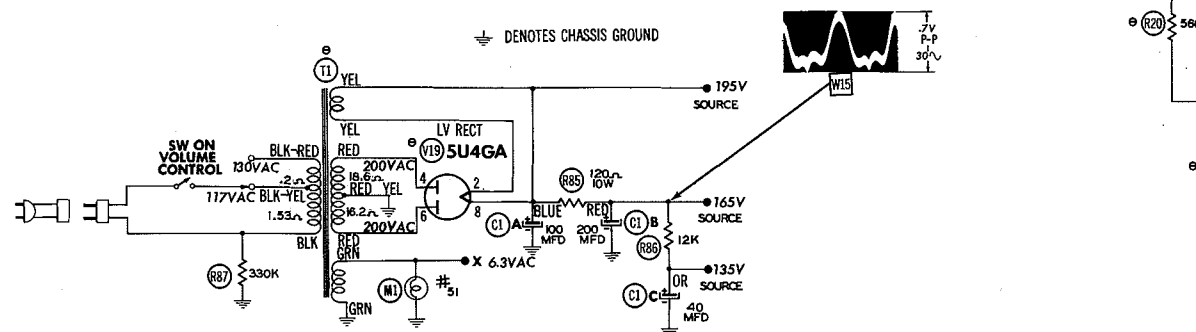
HOFFMAN MODELS 7B170, U, 7B182P, P2, 7M169, U, 7M181P, P2, 7M181P, 21B173, U, 21B176, S, U, 21B184, U, 21B185P, 21B188, U, U2, 21B191, C2, U, U2, 21B358, P, U, 21B360, 21B361U, U2, 21K186, U, U2, 21M172, U, 21M175, S, U, 21M183, P, U, 21M184P, 21M187, U, U2, 21M190, C2, U, U2, 21M357, P, U, 21M360, U, U2, 21P177, S, U, 21P185, 21P192, C2, U, U2, 21P359, P, U, 21P362, U, U2, 21U205S, U, 21W190, C2, U, U2, 21W360, U, U2, 21-189, U, U2 (Ch. 303-17, -21, 306-21, -21B, -21U, 307-21, 308-21, 309-21, -21U, -21U2, 309A-21, -21U, 310-21, -21C2, -21U, -21U2)



ALTERNATE TUNER SCHEMATICS
LOCATED ON PAGES 11, 16, 17.



VERT. INTEGRATOR NETWORK USED IN CHASSIS 303-17 & 303-21

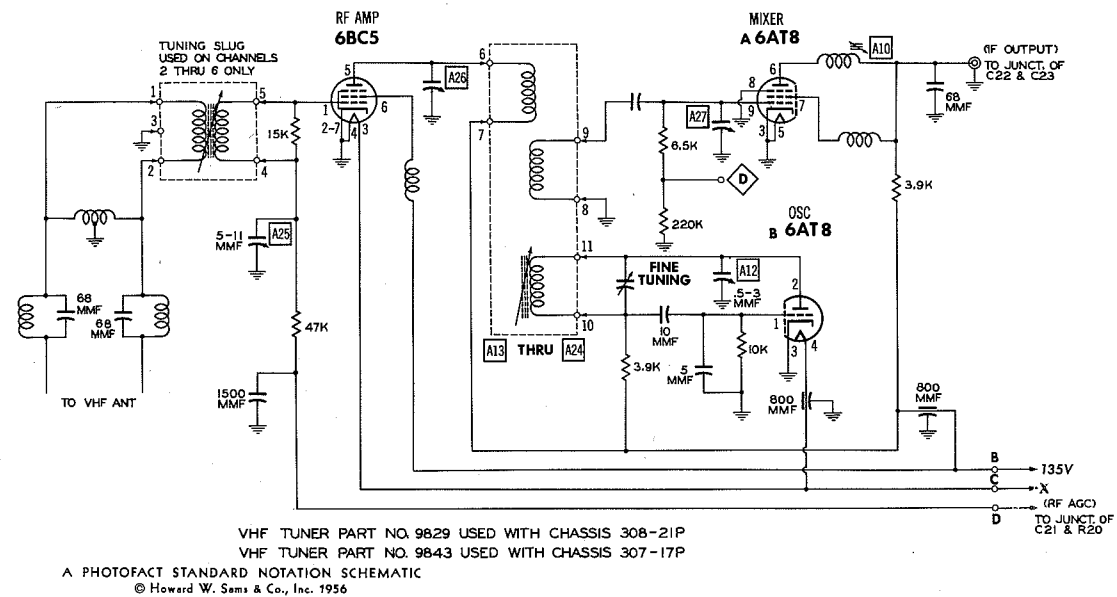


LV SUPPLY USED IN CHASSIS 303-17 & 303-21

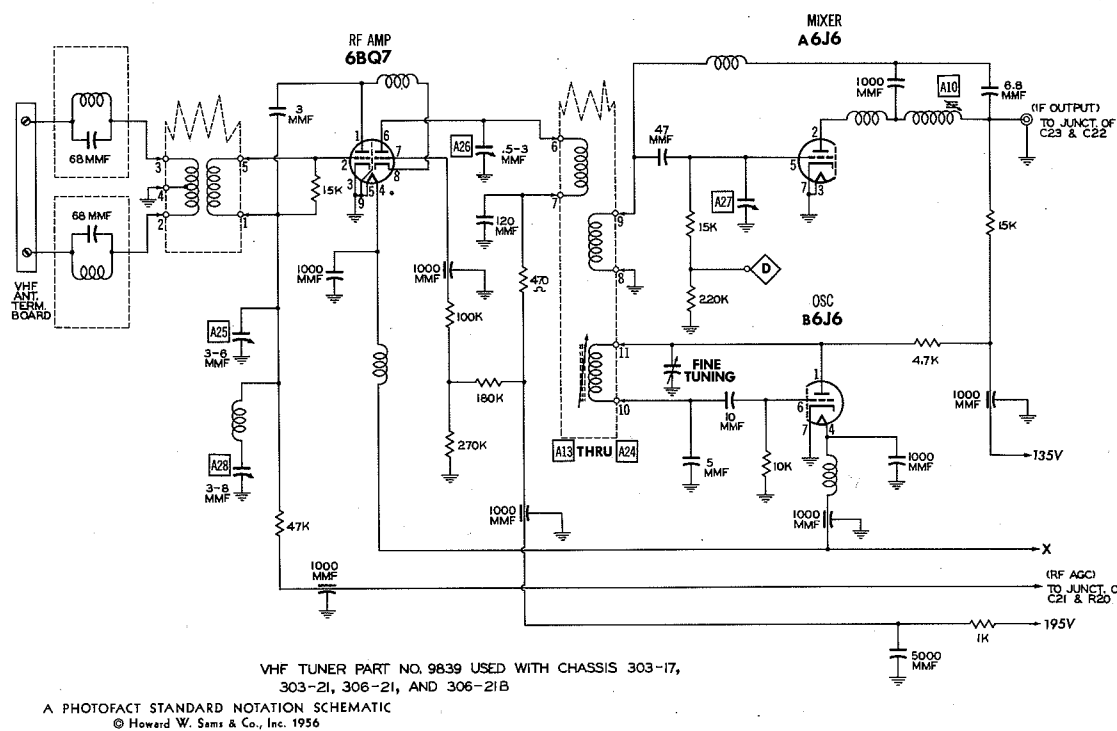
◆ MEASURED FROM PIN 8 OF V1.
● SEE PARTS LIST FOR ALTERNATE
VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT
SHOWN ON SCHEMATIC DIAGRAM. (SEE PARTS LIST)
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION
(CONTROL VIEWED FROM SHAFT END)
WAVE FORMS TAKEN WITH CONTROLS
SET TO PRODUCE 50 VOLTS PEAK-TO-
PEAK SIGNAL AT PICTURE TUBE

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation; no signal applied.

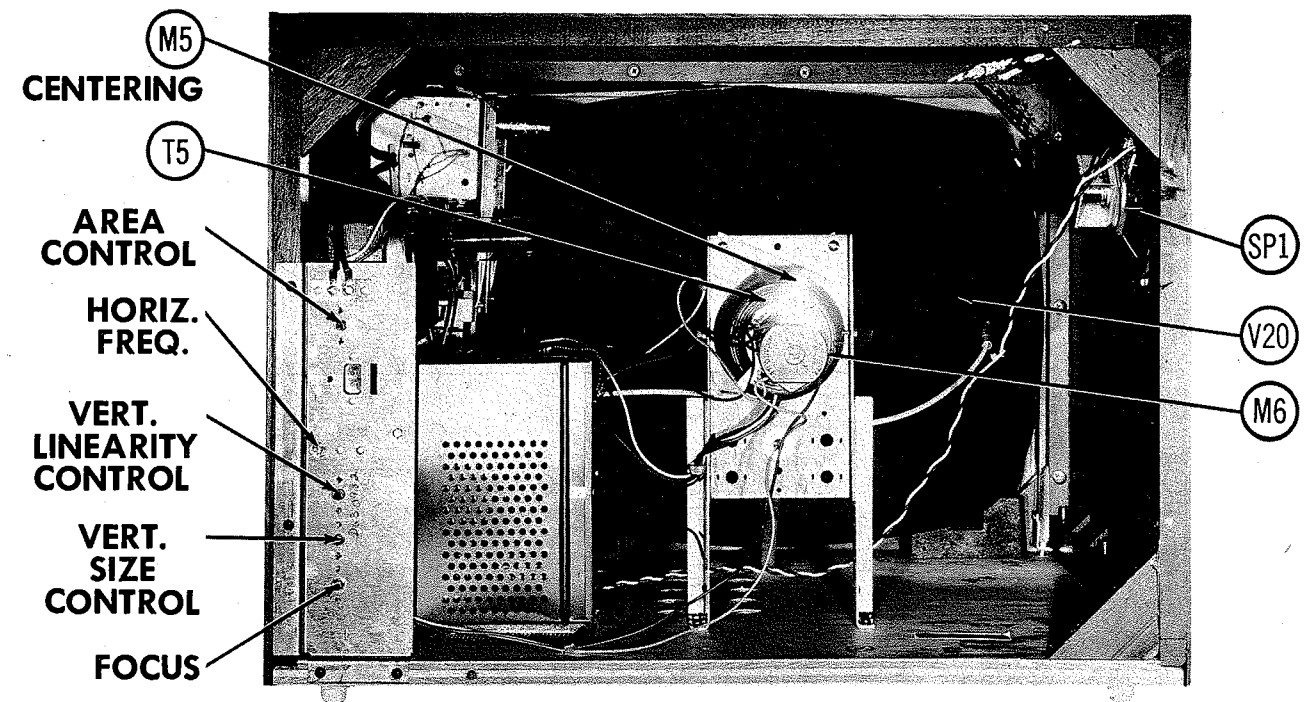
A PHOTOFAC STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1956



ALTERNATE VHF TUNER SCHEMATIC



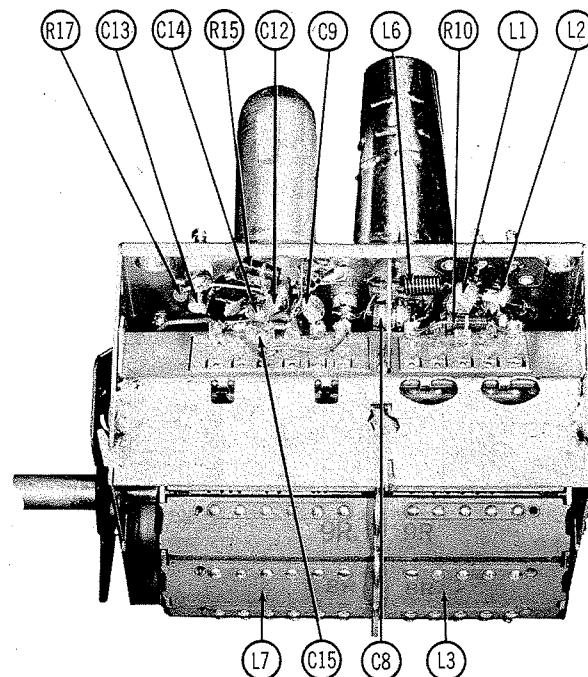
ALTERNATE VHF TUNER SCHEMATIC



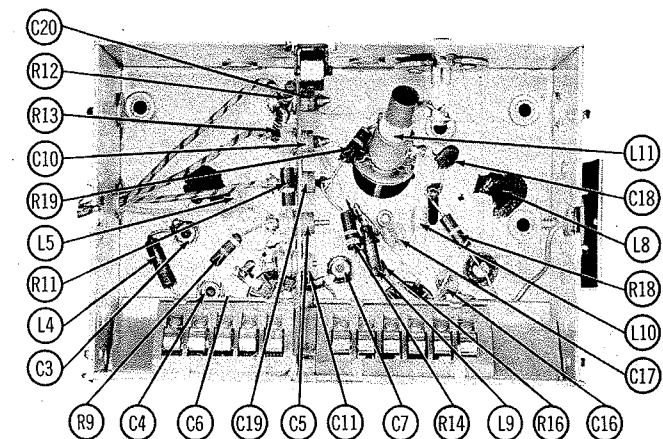
CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

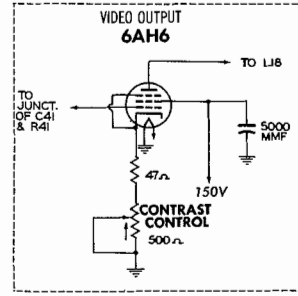
Turn the set on and tune in a TV station, preferably a test pattern.
Adjust the horizontal frequency slug of L23 until the picture synchronizes horizontally.
Switch off channel and back again, the picture should fall in sync.



RF TUNER RIGHT SIDE



RF TUNER BOTTOM VIEW



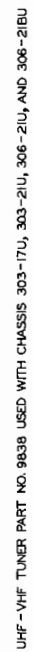
VIDEO OUTPUT CIRCUIT USED IN CHASSIS
303-17 AND 303-21

(M6) ———— ION TRA

© (V20) 21AUP4A

HOFFMAN MODELS 78170, U, 78182P, 72, PM169, U, 78181P, 72, 78181SP, 218173, U, 218176, S, U, 218184, U, 218185P, 218188, U, U2, 218191, U2, U2, 218358P, P, U, 218360, 218361U, U2, 218186, U, U2, 218172, U, 218175, S, U, 218183, P, U, 218184P, 218187, U, U2, 218190, U2, U2, 218357, P, U, 218360, U, U2, 218177, S, U, 218185, 218192, C, U, U2, 218359, P, U, 218362, U, U2, 218205S, U, 218190, C, C, U, U2, 218360, U, U2, 218189, U, U2 (ch. 303-17, 21, 306-21, -218, -219, 307-21, 308-21, 309-21, -219, -219U, 309A-21, -21U, 310-21, -21C2, -21U, -21U2)

HOFFMAN MODELS 7B170, U, 7B182P, P2, 7M169, U, 7M181P, P2, 7W181P, 21B173, U, 21B176, S, U, 21B184, U, 21B185P, 21B188, U, U2, 21B191, C2, U, U2, 21B35E, P, U, 21B360, 21B361U, U2, 21K186, U, U2, 21M172, U, 21M175, S, U, 21M183, P, U, 21M184P, 21M187, U, U2, 21M190, C2, U, U2, 21M357, P, U, 21M360, U, U2, 21P177, S, U, 21P185, 21P192, C2, U, U2, 21P359, P, U, 21P362, U, U2, 21U205S, U, 21W190, C2, U, U2, 21W360, U, U2, 21-189, U, U2 (Ch. 303-17, -21, 306-21, -21B, -21U, 307-21, 308-21, 309-21, -21U, -21U2, 309A-21, -21U, 310-21, -21C2, -21U, -21U2) U2, 21U205S, U, 21W190, C2, U, U2, 21W360, U, U2 (Ch. 303-17, -21, 306-21, -21B, -21U, 307-21, 308-21, 309-21, -21U, -21U2, 309A-21, -21U, 310-21, -21C2, -21U, -21U2)



A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1956

ALTERNATE VHF-UHF TUNER SCHEMATIC

HOFFMAN MODELS ZB170, U, 7B182P, P2, 7M169, U, 7M181P, P2, 7W181P, 21B173, U, 21B176, S, U, 21B184, U, 21B185P, 21B188, U, U2, 21B191, C2, U, U2, 21B358, P, U, 21B360, 21B361U, U2, 21K186, U, U2, 21M172, U, 21M175, S, U, 21M183, P, U, 21M184P, 21M187, U, U2, 21M190, C2, U, U2, 21M357, P, U, 21M360, U, U2, 21P177, S, U, 21P185, 21P192, C2, U, U2, 21P359, P, U, 21P362, U, U2, 21U2035, U, 21W190, C2, U, U2, 21W360, U, U2, 21-189, U, U2 (Ch. 303-17, -21, 306-21, -21B, -21U, 307-21, 308-21, 309-21, 310-21, -21C2, -21U, -21U2)

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		HOFFMAN PART No.	STANDARD REPLACEMENT	
V1	RF Amplifier	6BQ7A	6BQ7A	6BQ7 used as an alternate
V2	Mixer-Oscillator	6J8	6J8	
V3	1st. Video IF Amplifier	6CB6	6CB6	
V4	2nd. Video IF Amplifier	6CB6	6CB6	
V5	3rd. Video IF Amplifier	6CB6	6CB6	
V6	Video Detector	6AS8	6AS8	12AU7 used as an alternate
V7	Video Output	6CB6	6CB6	
V8	Sound IF Amplifier	6AU6	6AU6	
V9	Ratio Detector	6AL5	6AL5	
V10	AF Amplifier	6AV6	6AV6	
V11	Audio Output	6K6GT	6K6GT	6SN7GT used as an alternate 6BQ6GT used as an alternate
V12	Sync Separator	12AU7A	12AU7A	
V13	Vert. Oscillator	6C4	6C4	
V14	Vert. Output	6AQ5	6AQ5	
V15	Horiz. AFC	6AL5	6AL5	
V16	Horiz. Mult.	6SN7GT	6SN7GT	6SN7GT used as an alternate 6BQ6GT used as an alternate
V17	Horiz. Output	6BQ6GT	6BQ6GT	
V18	Damper	6CUB	6CUB	
V19	HV Rectifier	6AX4GT	6AX4GT	
V20	LV Rectifier	1X3B	1X3B	
V21	LV Rectifier	5U4GA	5U4GA	5U4GB used as an alternate

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA				NOTES
	HOFFMAN PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	
V20	21AUP4A ①	21AUP4A ①	21AUP4A ①	21AUP4A ②	① Aluminized ② Silver screen "85"
	21YP4A ① 17HP4	21YP4A ① 17HP4/ 17RP4	21YP4A ① 17HP4/ 17RP4	21AUP4A ② 21YP4A ② 17HP4/ 17RP4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA					
	CAP.	VOLT.	HOFFMAN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.
C1A	100	300	4204A			WQ505	CDB-1009	Q-225
B	200	200						D-100
C	40	200						
C2A	5	50	4209	PRS150V4	BR550	TC30	TD-5-50	MMT-0505
B	5	25	(Note 1)	SRE25V5	BR550	TC30	TD-5-50	MMT-0505

Note 1. Chassis prior to serial L568881 do not use item C2B.

FIXED CAPACITORS

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

ITEM No.	RATING		REPLACEMENT DATA								NOTES
	CAP.	VOLT	HOFFMAN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.		
C3	3-8				820-10						
C4	3-8				820-10						
C5	800										
C6	3			NP0-DI8	TCZ-3R3	Z007	NP0A-030	ZT-553	5TCCB-V33		
C7	.5-3				829-3		3115-01-0R5	CT565A			
C8	800			BPD-00012	DD-121	G044	811-121	UC-5312	5GA-T12		
C9	120										
C10	800										
C11	800										
C12	51			5151	DD-500	G035	831-510	UC-545	5GA-Q5		
C13	.5-3				820-3		3115-01-0R5	CT565A			
C14	10			NP0-DD0	TCZ-10	Z018	NP0A-100	ZT-541	5TCC-Q1		
C15	5										
C16	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15		
C17	1500			BPD-0005	DD-152	K071	801-0015	DC-5215	5HK-D15		
C18	6.8			NP0-DI8.8	TCZ-6R8	Z013	NP0A-6R8	ZT-5568	5TCCB-V68		
C19	800										
C20	800										
C21	.047	200	4147	BPD-05	DF-503	CUB2847		PT4447	2TM-847		
C22	470		14050	BPD-00047	DD-471	K060	831-471		5GA-T47		
C23	82			1469-000082	TCZ-82	Z040	NP0-337-820		5TCC-Q82	Note 3	
C24	1000		14031	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1		
C25	.1	200	4143	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	Note 2	
C26	470		14050	BPD-00047	DD-471	K060	831-471		5GA-T47		
C27	1000		14031	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1		
C28	47			NP0-DI47	TCZ-47	Z033	NP0-338-470		5TCC-Q47		
C29	2.2			NP0-SI2.2	TCZ-2R2	T205	NP0A-2R2		5TCCB-V22	Note 4	
C30	1000		14031	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1		
C31	470		14050	BPD-00047	DD-471	K060	801-471		5GA-T47		
C32	1000		14031	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1		
C33	33			NP0-DI33	TCZ-33	Z028	811-330		5TCC-Q33		
C34	470		14050	SI470	DE-471	K060	801-471		5GA-T47		
C35	470		14050	SI470	DE-471	K060	801-471		5GA-T47		
C36	1000		14031	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1		
C37	1000		14031	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1		
C38	10	200	14058	NP0-SI10	TCZ-10	T209	NP0A-100	ZT-541	5TCC-Q1	Note 2	
C39	.1	200	4143	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	Note 5	
C40	.047	200	4147	BPD-05	DF-503	CUB2847		PT4147	2TM-847		
C41	.1	200	4143	P288N-1	DF-104	CUB2P1		PT4101	2TM-P1		
C42	5000		4028	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5		
C43	5000		4029	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5		
C44	30		4043		TCZ-30	T217	831-300				
C45	.1	400	4150	P488N-1	DF-104	CUB4P1		PT401	4TM-P1		
C46	2.2		4089	NP0-SI2.2	TCZ-2R2	T205	NP0A-2R2		5TCCB-V22		
C47	68		4046								
C48A	4000		4038	BPD-2X004	D6-402	DK076	821-004	DC-524	5HK-2D4		
B	4000				D6-402			DC-524			
C49	680			51880	D6-681	TP50	811-681	UC-5368	5GA-T88	Note 4	
C50	5000		4029	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	Note 6	
C51	5000		4029	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5		
C52	5000		4029	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5		
C53	.0047	200	4127	84700	D6-472	CUB8D47	GP2-333-472	PT6247	8TM-D47	Note 7	
C54	.032	400	4180	84700	DF-203	CUB422	817-02	PT4122	4TM-S22		
C55	.0022	200	4138	1464-0022		RD522			5M-222		
C56	220	200	4084	SI220	D6-221	G051	811-221	DC-522	5GA-T22		
C57	.0047	400	4127	SI4700	D6-472	CUB8D47	GP2-333-472	PT6247	8TM-D47		
C58A	2000							DC-522			
B	5000		*9895	*PA-110	*PC-100	*115TM1	*1405-01	DC-525	*V-1		
C	5000							DC-525			

PARTS LIST AND CAPACITOR

ITEM No.	RATING		REPLACEMENT DATA			NOTES
	CAP.	VOLT.	HOFFMAN PART No.	AEROVOX PART No.	CENTRALAB PART No.	
C59	5000		4029	BPD-005	DD-502	Note 1
C60	.1	400	4150	P488N-1	DF-104	
C61	.047	200	4133	BPD-05	DF-503	
C62	.047	200	4133	BPD-05	DF-503	
C63	1000		14031	BPD-001	DD-102	
C64	.01	800	14119			Note 2
C65	.01	800	14119			
C66	20000		14084	BPD-02	DD-203	
C67	.047	200	4158	BPD-05	DF-503	
C68	.001	200	4175	1484-001		
C69	.001	200	4175	1484-001		Note 3
C70	.0047	200	4127	SI4700	D6-472	
C71	.047	200	4158	BPD-05	DF-503	
C72	3900	500	4085	1464-0039		
C73	470	500	14050	1489-00047	D6-471	
C74	470	500	14050	1489-00047	D6-471	Note 4
C75	5000		4029	BPD-005	DD-502	
C76	.22	200	4131	P288N-22		
C77	47	3000	14048	HVD-30-47	DD30-470	
C78	.047	400	4133	BPD-05	DF-503	
C79	47	3000	14048	HVD-30-47	DD30-470	Note 5
C80	.1	600	4144	P688N-1	DF-503	

* Items C58A, C58B, C58C, R62A, R62B and R62C are combined.
 Note 2. Not used in chassis 303.
 Note 3. Some versions may use a 68MMF unit in this application.
 Note 4. Used only in chassis 303.
 Note 5. Chassis 303 uses a .47MFD unit (part #4172) in this applic.
 Note 6. Chassis 303 uses a .001MFD unit (part #41031) in this appli.
 Note 7. Chassis 303 uses a .01MFD unit (part #4142) in this applic.
 Note 8. Chassis 303 uses a .005MFD unit (part #4029) in this applic.
 Note 9. Chassis 303 uses a .035MFD unit (part #4127) in this appli.

CONTR

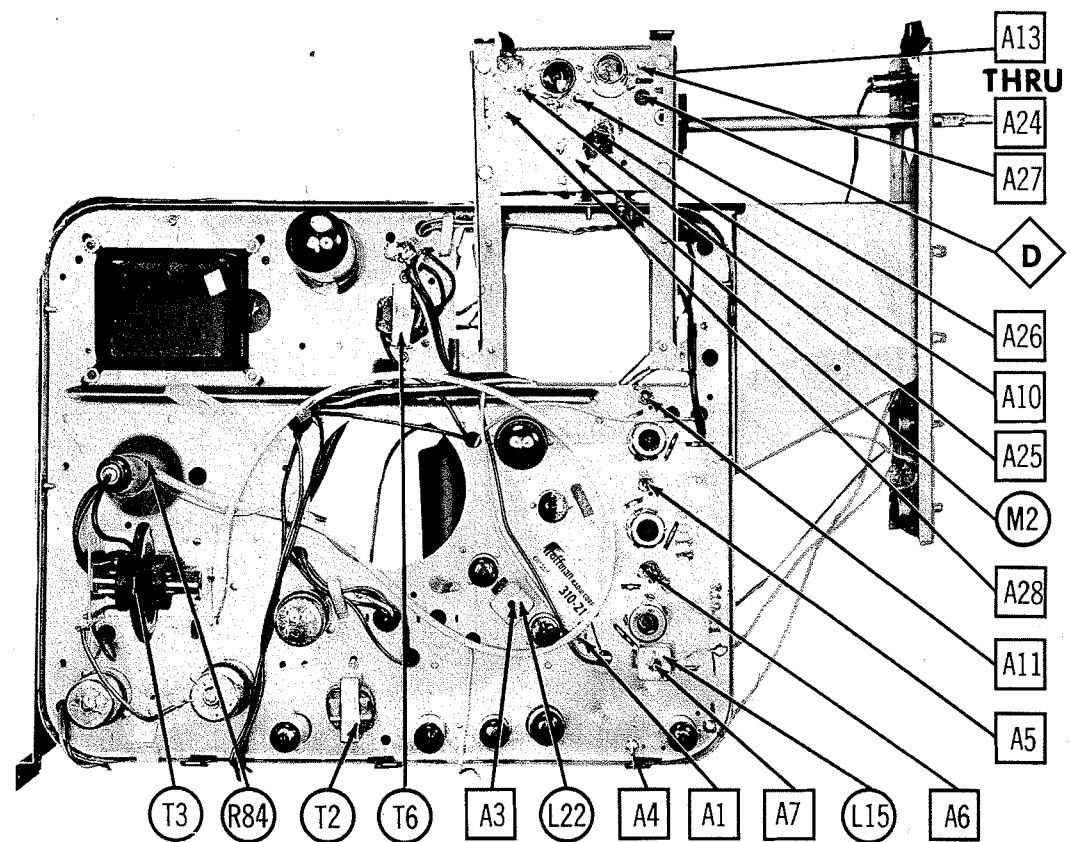
ITEM No.	RATING		REPLACEMENT DATA			NOTES
	RESISTANCE	WATTS	HOFFMAN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	
R1A	500KΩ		4987	AB-60	A47-500K-Z	Note 1
B	Shaft		Not Req.	AK-4	KSS-3	
C	Switch		Not Req.	KB-1	SWE-12	
R2A	500Ω		4988	AB-4	A47-500-S	
B	Shaft		Not Req.	AK-4	KSS-3	
R1A	500Ω		4980	F1-1	RTV-463	Note 2
B	500KΩ			R2-48		
R1A	500Ω		4991	KB-1		
R2C	Switch					
R3A	150KΩ		4985	AB-43	A47-150K-S	
B	Shaft		Not Req.	AK-4	KSS-3	Note 3
R3	150KΩ		4974			
R3	150KΩ		4989			
R4A	500KΩ		4986	AB-59	A47-500K-S	
B	Shaft		Not Req.	AK-4	KSS-3	
R4	500KΩ		4980			Note 4
R4	500KΩ		4975			
R5A	4Meg		4970	AB-86	A47-4Meg-S	
B	Shaft		Not Req.	AK-1	FKS-1/4	
R5	4Meg		4989			
R6A	50KΩ		4972	BX-31	A47-50K-S	Note 5
B	Shaft		Not Req.		FKS-1/4	
R6	50KΩ		4973			
R7A	4Meg		4970	AB-86	A47-4Meg-S	
B	Shaft		Not Req.	AK-1	FKS-1/4	
R7	4Meg		4989			Note 6
R6A	2Meg		4985	BX-75	A47-2Meg-S	
B	Shaft		Not Req.		FKS-1/4	
R8A	1.5Meg		4929	AB-75	A47-1.5Meg-S	
B	Shaft		Not Req.	AK-1	FKS-1/4	
R8	1.5Meg		4971			Note 7

Note 1. Used in Chassis 307, 308, and 310.
 Note 2. Used in Chassis 303.
 Note 3. Used in Chassis 308 and 308.
 Note 4. Used in Chassis 306, 307, 308, 309, and 310.
 † Concentrik Equivalent, K-2 Kit, Base Elements and Shafts, B1

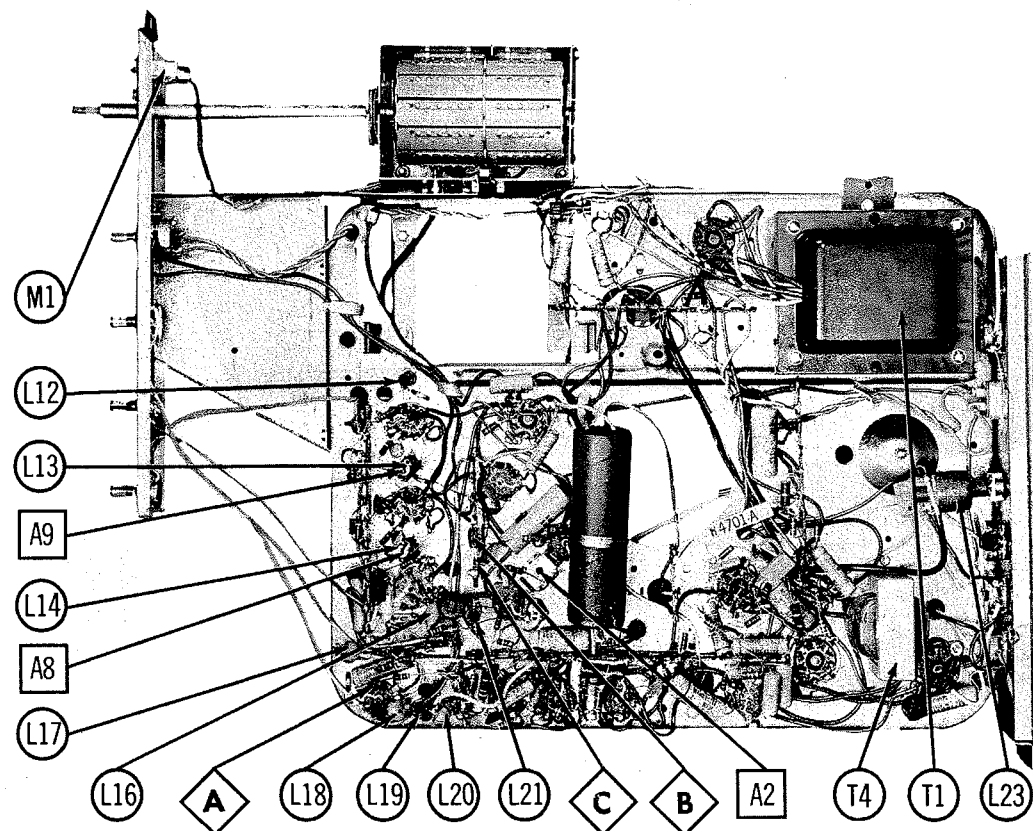
* Universal Replacement (Mallory Exact Duplicate Part No. UE-7)
 * Concentrik Equivalent, K-4 Kit, Base Element and Shafts, B11

RESISTO

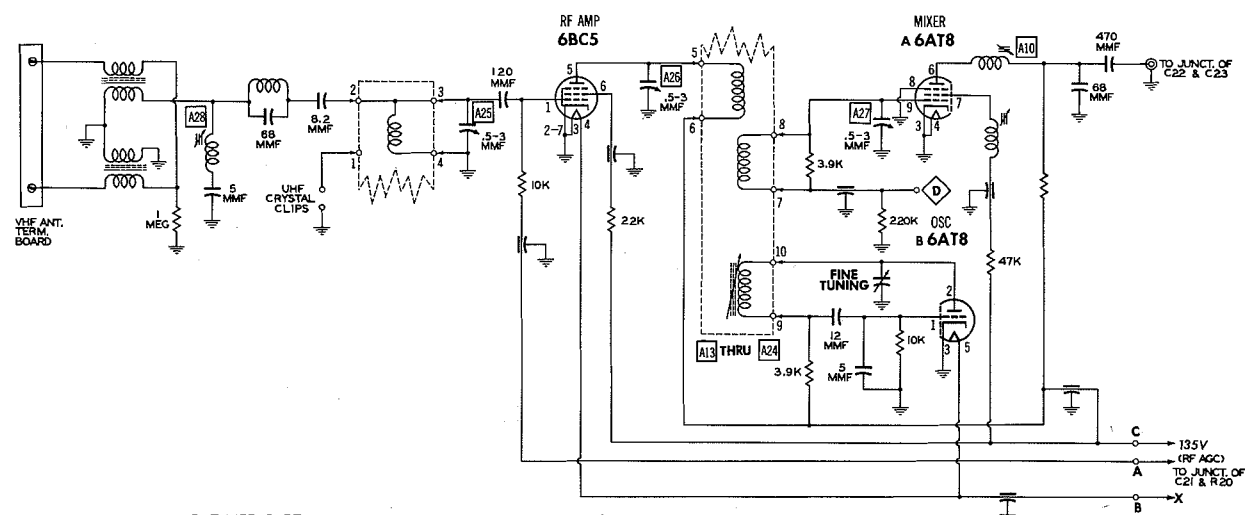
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	HOFFMAN PART No.	IRC PART No.	
R9	47KΩ		4559	BTS-47K	Note 1
R10	15KΩ				
R11	100KΩ		4571	BTS-100K	
R12	270KΩ		4602	BTS-270K	
R13	180KΩ		4634	BTS-180K	
R14	470Ω		4638	BTS-470	Note 2
R15	10KΩ		4597		
R16	470Ω			BTS-4700	
R17	15KΩ				
R18	220KΩ		4618		
R19	15KΩ				Note 3
R20	560KΩ		4590	BTS-560K	
R21	270KΩ		4602	BTS-270K	
R22	270Ω		4579	BTS-270Ω	
R23	470Ω		4638	BTS-470	
R24	470Ω		4638	BTS-470	Note 4
R25	47KΩ		4559		
R26	470Ω		4638	BTS-470	
R27	47Ω		4639	BTS-47	
R28	470Ω		4638	BTS-470	
R29	15KΩ				Note 5
R30	470Ω		4638	BTS-470	
R31	47Ω		4639	BTS-47	
R32	47KΩ		4559		
R33	470Ω		4638	BTS-470	
R34	1000Ω	2	14698	BTS-1000	Note 6



CHASSIS TOP VIEW

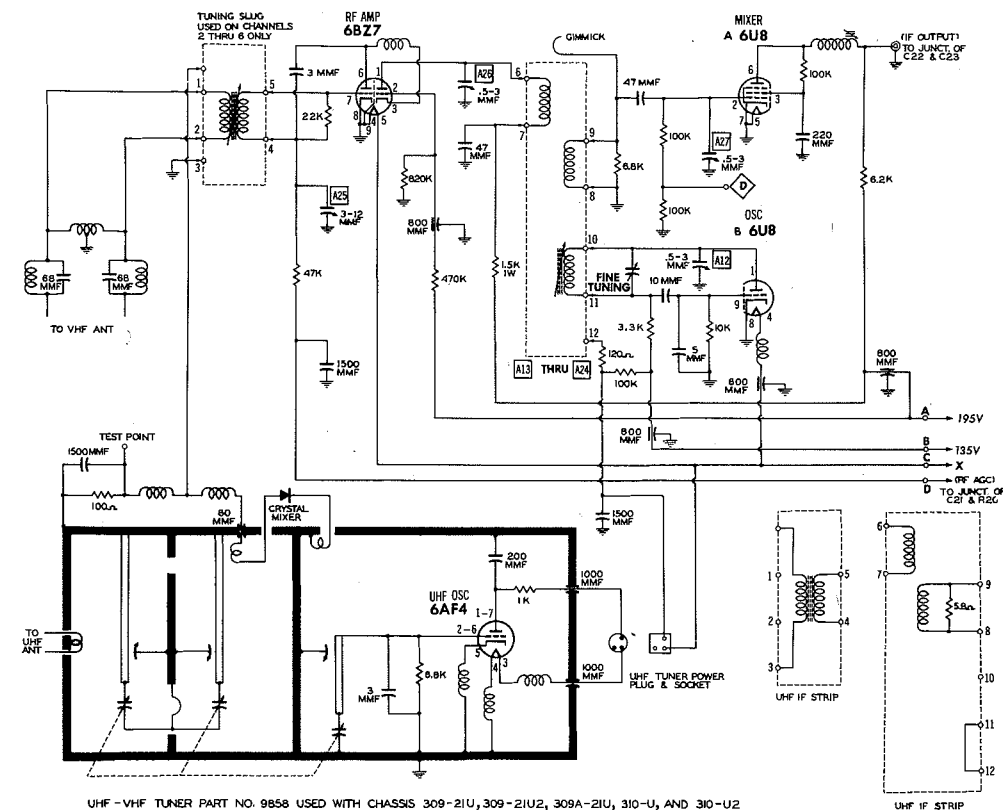


CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENT.



VHF TUNER PART NO. 9850 USED WITH CHASSIS 307-17P2
 VHF TUNER PART NO. 9855 USED WITH CHASSIS 309-21P2, AND 309A-21P2
 A PHOTOFAC STANDARD NOTATION SCHEMATIC
 © Howard W. Sams & Co., Inc. 1956

ALTERNATE VHF TUNER SCHEMATIC



UHF - VHF TUNER PART NO. 9858 USED WITH CHASSIS 309-21U, 309-21U2, 309A-21U, 310-U, AND 310-U2
 A PHOTOFAC STANDARD NOTATION SCHEMATIC
 © Howard W. Sams & Co., Inc. 1956

ALTERNATE VHF-UHF TUNER SCHEMATIC

DESCRIPTIONS
(cont)

REPLACEMENT DATA					NOTES
ARNELL- BILIER IT No.	ERIE PART No.	MALLOY PART No.	SPRAGUE PART No.		
80	81L-005	DC-525	5HK-D5	Note 8 Note 9 Note 2 Note 2	
B4P1		PT901	4TM-P1		
B3S47		PT4147	2TM-S47		
E2S47		PT4147	2TM-S47		
89	801-001	DC-521	5HK-D1		
85	817-02	PT612	5HK-S5		
B3S47		PT4147	2TM-S47		
5D1			MS-21		
5D1			MS-21		
UB6D47	GP2-333-472	PT6247	6TM-D47		
UB2S47		PT4147	2TM-S47		
5D39			MS-239		
			2TM-S47		
1S1747	81L-471		MS-347		
1S1747		81L-471	MS-347		
1D60		81L-005	5HK-D5		
UB2P22		PT2122	2TM-P22		
Q47	3KV-470	DC30447	30GA-Q47		
UB4S47		PT4147	4TM-S47		
Q47		DC30447	30GA-Q47		
UB6P1		PT601	6TM-PI		

ITEM No.	RATING		HOFFMAN PART No.	IRC PART No.	NOTES
	OHMS	WATT			
R61	2200Ω	5%	24525	BTS-2200 5%	Note 13
R62A	22KΩ			BTS-22K	
B	8200Ω		• 9695	BTS-8200	
C	8200Ω			BTS-8200	
R63	560KΩ		4590	BTS-560K	Note 11
R64	1Meg		4614	BTS-1Meg	
R65	33KΩ		4586	BTS-33K	
R66	6.8Meg		4604	BTS-6.8Meg	
R67	68KΩ		4571	BTS-68K	Note 12
R68	100KΩ		4546	BTS-100K	
R69	120Ω		4571	BTS-120	
R70	100KΩ		4571	BTS-100K	
R71	100KΩ		4571	BTS-100K	Note 14
R72	4.7Meg		34859	BTS-4.7Meg	
R73	470KΩ		4622	BTS-470K	
R74	8200Ω		4651	BTS-8200	
R75	1500Ω	5%	4610	BTS-1500 5%	Note 13
R76	100KΩ		4571	BTS-100K	
R77	82KΩ		24670	BTS-82K	
R78	5600Ω		4629	BTS-5600	
R79	470KΩ		4622	BTS-470K	Note 14
R80	22KΩ		4628	BTS-22K	
R81	1800Ω		24518	BTS-1800	
R82	1000Ω		4659	BTS-1000	
R83	15Ω		14508	BTS-15	BW 1-2.2 1 3/4A-125 BTS-12K BTS-330K
R84	2.2Ω		4735	BTS-2.2	
R85	120Ω		4701A	BTS-120	
R86	12KΩ		4646	BTS-12K	
R87	330KΩ		34531	BTS-330K	Note 14
R88	100KΩ		4622	BTS-100K	
R89	120Ω		4735	BTS-120	
R90	12KΩ		4646	BTS-12K	

Note 1. A 2.2Meg 1/2W resistor is used in Chassis 303. (Migr. Part No. 4502).
Note 2. A 390KΩ 1/2W resistor is used in Chassis 303. (Migr. Part No. 4633).
Note 3. A 1200Ω 1W resistor is used with Pentode Tuner. (Migr. Part No. 24503).
Note 4. Not used in some versions.
Note 5. Some versions use a 1000Ω 1/2W resistor in this application.
Note 6. Some versions use a 3900Ω 1/2W resistor in this application.
Note 7. A 560KΩ 1/2W resistor is used in Chassis 303.
Note 8. A 820KΩ 1/2W resistor is used in chassis prior to serial #B614642.
Note 9. A 4.7Meg 1/2W resistor is used in Chassis 306, 307, 308, 303. (Migr. Part No. 34659).
Note 10. A 3000Ω 1/2W resistor is used in Chassis 303. (Migr. Part No. 34538).
Note 11. A 470KΩ 1/2W resistor is used in Chassis 303. (Migr. Part No. 4622).
Note 12. A 100KΩ 1/2W resistor is used in some versions in this application. (Migr. Part No. 4571).
Note 13. A 1200Ω 1W resistor is used in Chassis 303. (Migr. Part No. 4652).
Note 14. A 47KΩ 1/2W resistor is used in Chassis 303.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	HOFFMAN PART No.	Holldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @1.34A	420VCT .240ADC	5VAC @ 3A	6.3VAC @8A	5087-1 5087 ② 5086 ③ 5088 ④ 5082 ⑤	P9735 ⑦	P-2831 ⑥	P-8188 ③		R-80BC ①

- ① Tape 6.3V @ 1.2A winding.
② Used in Chassis 309 and 310.
③ Used in Chassis 306 and 308.
④ Used in Chassis 307.
⑤ Used in Chassis 303-17 and 303-21.
⑥ Use low taps on secondary #1, tape other leads. Tape 5V @ 2A winding.
⑦ Use low taps on secondary #1 tape other leads, tape 6.3V @ 2A winding.
⑧ Use high taps on secondary #1 tape other leads. Phase and parallel 6.3V winding for secondary #3.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA							
		HOFFMAN PART No.	Holldorson PART No.	Merit PART No.	RCA TYPE No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T2	Vert. Osc. Trans.	5176-2 5176 ① 5134A-1 ② 5187 ③ 5125A ④	B6704	A-3008	* 235T1 *	X094 *	A-8255 *	FLY-77 *	D-49 *
T3	Horiz. Output Trans.	5106A 5106-2 ① 99723 99740 ①	FB420 *	HVO-54 *		V306 ⑤ Y70F30.8 ⑥	A-8140 ③ DY-10A ③	26857 ⑤ Y-11 ⑤	A-110X ⑤ Y-20 ⑤
T4	Vert. Output Trans.	5106A 5106-2 ① 99723 99740 ①	Z1900 ③ DF603 ③	A-2825 MDF-74 ③		V306 ⑤ Y70F30.8 ⑥	A-8140 ③ DY-10A ③	26857 ⑤ Y-11 ⑤	A-110X ⑤ Y-20 ⑤
T5A	Yoke Horiz. (24MH)	99723 99740 ①	DF603 ③	MDF-74 ③	214D1 ③	Y70F30.8 ⑥	DY-10A ③	Y-11 ⑤	Y-20 ⑤
B	Vert. (3.7MH)	99723 99740 ①	DF603 ③	MDF-74 ③	214D1 ③	Y70F30.8 ⑥	DY-10A ③	Y-11 ⑤	Y-20 ⑤

- ① Alternate Hoffman Part Number.
② Used in Chassis 310.
③ Used in Chassis 306 & 308.
④ Used in Chassis 307.
⑤ Drill new mounting hole(s).
⑥ Connect as auto transformer.
⑦ Use 50 to 1 turns ratio.
⑧ Use original rear cover and centering device.
⑨ Use original horizontal damping network.

* HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type is Listed

	ORIGINAL TERMINAL CONNECTIONS	Holldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
7	5	5	9	9	5	5	5	5
4	4	4	7	7	4	4	4	6
1	1	1	1	1	1	1	1	2

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	HOFFMAN PART No.	Holldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T6	7.8KΩ	3.2Ω	5128 5116A ②	Z1115 ①	A-2931 ①	A-3878 ①	24849	S-8X	① Drill one new mtg. hole. ② Used in Chassis 303-17 and 303-21.

ion.
ation.
ion. (some chassis use .001MFD unit)
ion.
ation.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	HOFFMAN PART No.	IRC PART No.	
35	150Ω		4616	BTS-150	Note 5 Note 6
36	2200Ω		4650	BTS-2200	
37	2700Ω		4579	BTS-2700	
38	12KΩ		4646	BTS-12K	
39	47KΩ		4559	BTS-47K	Note 7
40	1.5Meg		4605	BTS-1.5Meg	
41	470KΩ		4622	BTS-470K	
42	4700Ω		4570	BTA-4700	
43	180KΩ		4634	BTS-180K	Note 8, 9
44	22KΩ		4628	BTS-22K	
45	6800Ω		4557	BTS-6800	
46	150Ω		4616	BTS-150	
47	10KΩ		4597	BTS-10K	Note 10
48	10KΩ		4597	BTS-10K	
49	180Ω		14618	BTS-180	
50	10Meg		4655	BTS-10Meg	
51	220KΩ		4619	BTS-220KΩ	Note 8, 9
52	470KΩ		4622	BTS-470K	
53	270Ω		4663	BTS-270	
54	10KΩ		4597	BTS-10K	
55	2.2Meg		4606	BTS-2.2Meg	Note 8, 9
56	470KΩ		4622	BTS-470K	
57	470KΩ		4622	BTS-470K	
58	2700Ω 5%		24533	BTS-2700 5%	
59	3900Ω		4527	BTS-3900	Note 10
60	1800Ω		4640	BTS-1800	

-103, P1-204 (Panel)
-133X, R1-223 (Rear)
1 (Switch)
103, P1-204 (Panel)
-133, R1-223 (Rear)
(Switch)

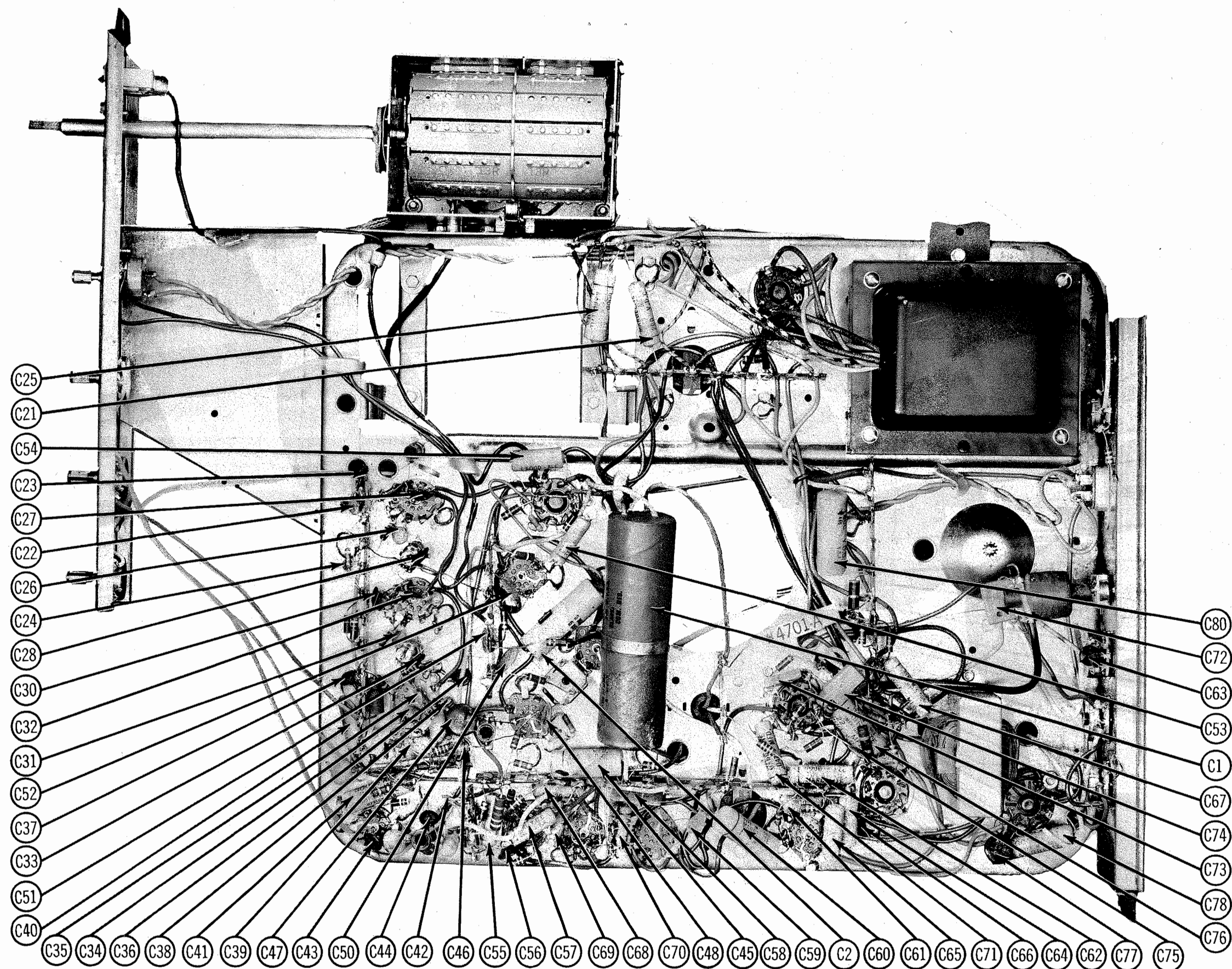
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	HOFFMAN PART No.	IRC PART No.	
35	150Ω		4616	BTS-150	Note 5 Note 6
36	2200Ω		4650	BTS-2200	
37	2700Ω		4579	BTS-2700	
38	12KΩ		4646	BTS-12K	
39	47KΩ		4559	BTS-47K	Note 7
40	1.5Meg		4605	BTS-1.5Meg	
41	470KΩ		4622	BTS-470K	
42	4700Ω		4570	BTA-4700	
43	180KΩ		4634	BTS-180K	Note 8, 9
44	22KΩ		4628	BTS-22K	
45	6800Ω		4557	BTS-6800	
46	150Ω		4616	BTS-150	
47	10KΩ		4597	BTS-10K	Note 10
48	10KΩ		4597	BTS-10K	
49	180Ω		14618	BTS-180	
50	10Meg		4655	BTS-10Meg	
51	220KΩ		4619	BTS-220KΩ	Note 8, 9
52	470KΩ		4622	BTS-470K	
53	270Ω		4663	BTS-270	
54	10KΩ		4597	BTS-10K	
55	2.2Meg		4606	BTS-2.2Meg	Note 8, 9
56	470KΩ		4622	BTS-470K	
57	470KΩ		4622	BTS-470K	
58	2700Ω 5%		24533	BTS-2700 5%	
59	3900Ω		4527	BTS-3900	Note 10
60	1800Ω		4640	BTS-1800	

PARTS LIST AND DESCRIPTIONS (Continued)
SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	HOFFMAN PART No.	QUAM PART No.	RCA TYPE No.	
SP1	5 1/4"	PM	3.2Ω	H9091-2 ① H9091 ② H9079 ③ 9117 ④ 9102 ⑤	52A1	217S1	① 5 1/4" PM speaker used in Models 21M175S, 21B176S, 21P177S, 21M178SU, 21B178SU, 21P177SU, 21W190, 21M190, 21B191, 21P192, 21W190C2, 21M190C2, 21B191C2, 21P192C2, 21W190U, 21M190U, 21B191U, 21P192U, 21W190U2, 21M190U2, 21B191U2, and 21P192U2 ② Alternate 5 1/4" PM speaker. ③ Used in Models 21W360, 21M360, 21B360, 21P362, 21W360U, 21M360U, 21B361U, 21P362U, 21U360U2, 21M360U2, 21B361U2, and 21P362U2. ④ Used in Models 7M181P, 7M181P2, 7B182P, 7B182P2, 7W181P, 21M183, 21B184, 21M183U, 21B184U, 21M183P, 21B184P, 21K186, 21M187, 21B188, 21-189, 21K186U, 21M187U, 21B188U, 21-189U, 21K186U2, 21M187U2, 21B188U2, and 21-189U2. ⑤ Used in Models 21U205S, 21U205SU, 21M357, 21B358, 21P359, 21M357U, 21B358U, 21P359U, 21M357P, 21B358P, and 21P359P.

COILS (RF-IF)

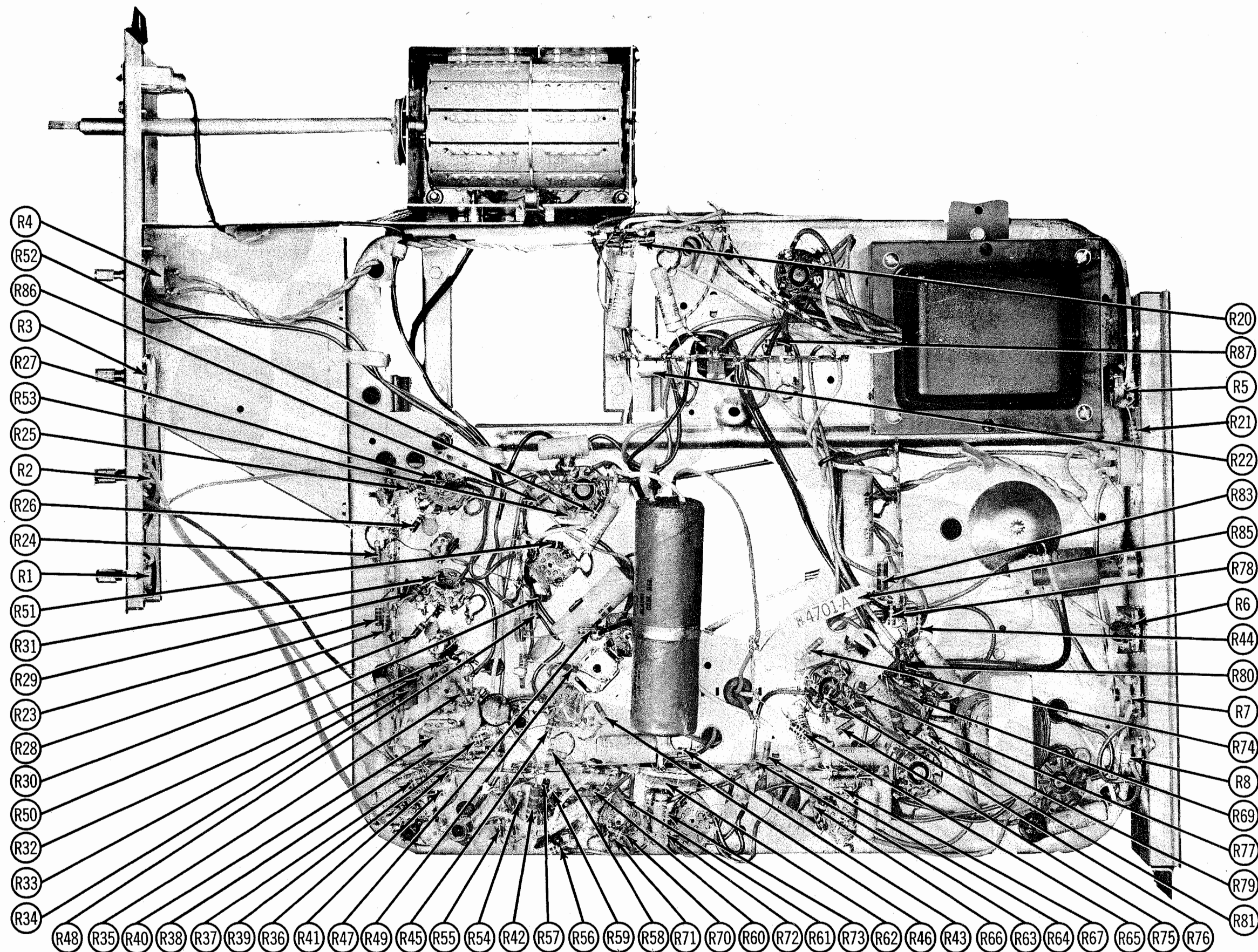
ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	HOFFMAN PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	IF Trap	0Ω						Wound on 68MMF Cap. Wound on 68MMF Cap.
L2	IF Trap	0Ω						
L3	Ant. Coils	0ΩCT	0Ω					
L4	IF Trap	1Ω						
L5	Fl. Choke	0Ω						Includes 41.25MC Trap Includes 47.25MC Trap Note 1
L6	Neut. Coil	0Ω						
L7	RF, Mixer Grid, Osc. Coils	0Ω						



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

SET 312 FOLDER 6

HOFFMAN MODELS 7B170, U, 7B182P, P2, 7M169, U, 7M181P, P2, 7W181P, 21B173, U, 21B176, S, U, 21B184, U, 21B185P, 21B188, U, U2, 21B191, C2, U, U2, 21B358, P, U, 21B360, 21B361U, U2, 21K186, U, U2, 21M172, U, 21M175, S, U, 21M183, P, U, 21M184P, 21M187, U, U2, 21M190, C2, U, U2, 21M357, P, U, 21M360, U, U2, 21P177, S, U, 21P185, 21P192, C2, U, U2, 21P359, P, U, 21P362, U, U2, 21U2035, U, 21W190, C2, U, U2, 21W360, U, U2, 21-189, U, U2 (Ch. 303-17, -21, 306-21, -21B, -21U, 307-21, 308-21, 309-21, -21U, -21U2, 309A-21, -21U, 310-21, -21C2, -21U, -21U2)



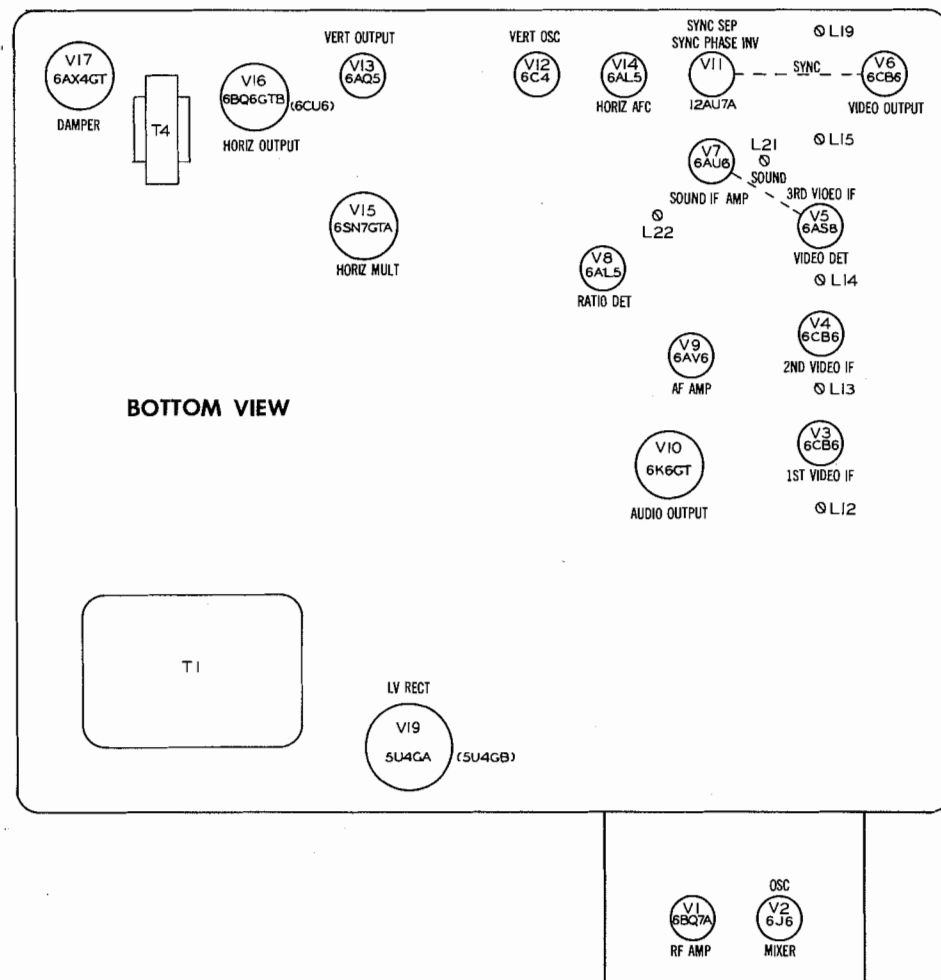
CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

HOFFMAN MODELS 78170, U, 78182P, P2, 7M169, U, 7M181P, P2, 7M181P, 218173, U, 218176, S, U, 218184, U, 218185P, 218188, U, U2, 218191, C2, U, U2, 218358, P, U, 218360, 218361U, U2, 21K186, U, U2, 21M172, U, 21M175, S, U, 21M183, P, U, 21M184P, 21M187, U, U2, 21M190, C2, U, U2, 21M357, P, U, 21M360, U, U2, 21P177, S, U, 21P185, 21P192, C2, U, U2, 21P359, P, U, 21P360, U, U2, 21U2055, U, 21W190, C2, U, U2, 21W360, U, U2, 21-189, U, U2 (Ch. 303-17, -21, 306-21, -21B, -21U, 307-21, 308-21, 309-21, -21U, -21U2, 309A-21, -21U, 310-21, -21C2, -21U, -21U2)

RESISTANCE MEASUREMENTS

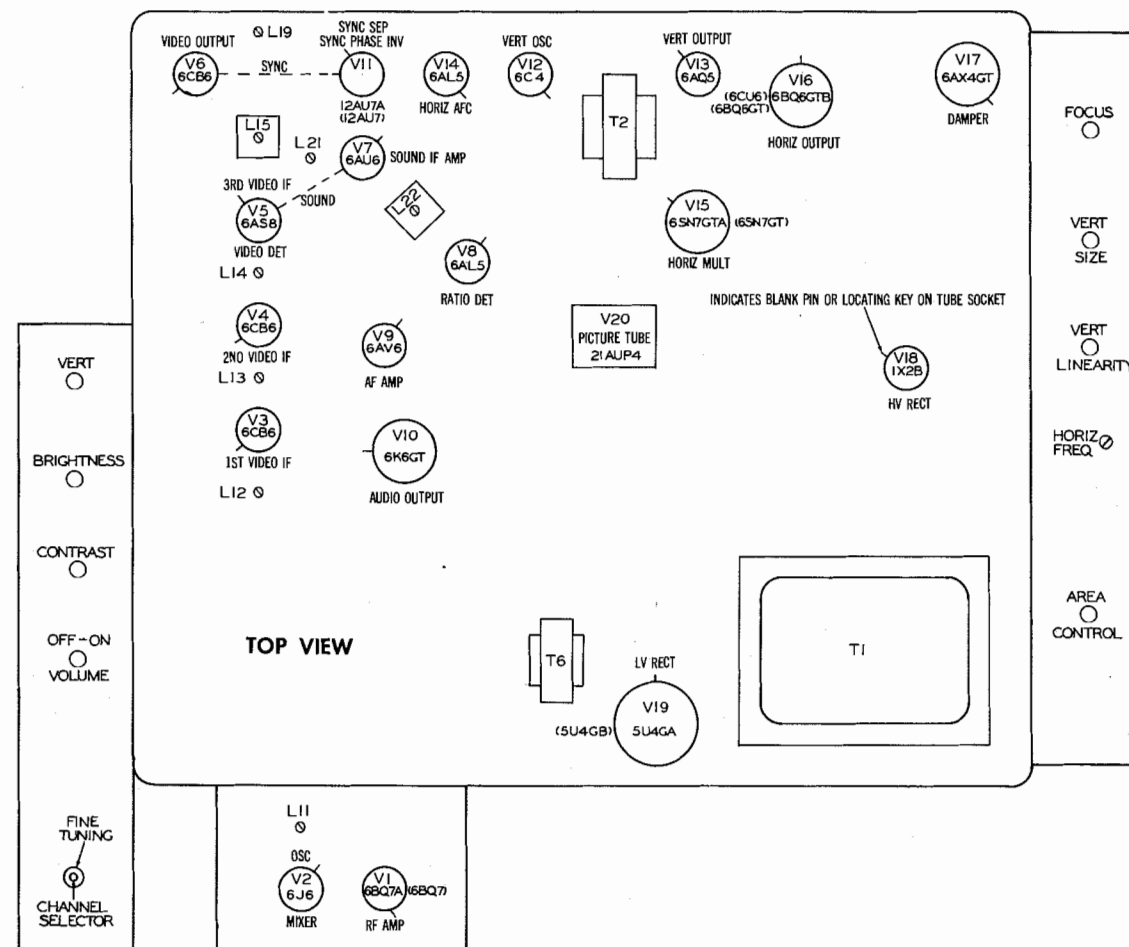
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7A	INF	1Meg	0Ω	.1Ω	0Ω	↑ 600Ω	220KΩ	INF	0Ω
V 2	6J6	↑ 7.5KΩ	↑ 18KΩ	.1Ω	0Ω	235KΩ	10KΩ	0Ω		
V 3	6CB6	1.5Meg	47Ω	.1Ω	0Ω	↑ 1.6KΩ	↑ 1.6KΩ	0Ω		
V 4	6CB6	1.5Meg	47Ω	.1Ω	0Ω	↑ 1.6KΩ	↑ 1.6KΩ	0Ω		
V 5	6AS8	↑ 1.6KΩ	.1Ω	150Ω	0Ω	.1Ω	5KΩ	0Ω	.1Ω	↑ 1.6KΩ
V 6	6CB6	470KΩ	110Ω	0Ω	.1Ω	↑ 4.8KΩ	↑ 12KΩ	110Ω		
V 7	6AU6	1.1Ω	0Ω	.1Ω	0Ω	↑ 7KΩ	↑ 7KΩ	150Ω		
V 8	6AL5	INF	INF	0Ω	.1Ω	20KΩ	0Ω	0Ω		
V 9	6AV6	10Meg	0Ω	0Ω	.1Ω	NC	NC	↑ 220KΩ		
V 10	6K6GT	TP	.1Ω	↑ 400Ω	↑ 120Ω	470KΩ	NC	0Ω	270Ω	
V 11	12AU7A	↑ 6.7KΩ	↑ 470KΩ	4KΩ	0Ω	0Ω	↑ 470KΩ	2.7Meg	0Ω	.1Ω
V 12	6C4	↑ 1.5Meg	NC	.1Ω	0Ω	↑ 1.5Meg	800KΩ	0Ω		
V 13	6AQ5	6.8Meg	0Ω	.1Ω	0Ω	↑ 600Ω	↑ 120Ω	6.8Meg		
V 14	6AL5	15Ω	15Ω	.1Ω	0Ω	4.8Meg	0Ω	4.8Meg		
V 15	6SN7GTA	5Meg	↑ 8.3KΩ	1.5KΩ	100KΩ	↑ 82KΩ	1.5KΩ	.1Ω	0Ω	
V 16	6BQ6GTB/6CU6	TP	.1Ω	NC	↑ 1.9KΩ	500KΩ	NC	0Ω	0Ω	TOP CAP ↑ 9Ω
V 17	6AX4GT	TP	NC	1.5Meg	NC	↑ 120Ω	NC	.1Ω	0Ω	
V 18	1X2B		PINS 1-9	HAVE	INF	RESISTANCE				TOP CAP ↑ 470Ω
V 19	5U4GA	NC	70KΩ	NC	19Ω	NC	16Ω	NC	70KΩ	
V 20	21AUP4A	0Ω	22KΩ	PIN 6 ↑ 30Ω	PIN 10 ↑ 19Ω	PIN 11 ↑ 280KΩ	PIN 12 .1Ω			

↑ MEASURED FROM PIN 8 OF V19.
 ▲ MEASURED FROM PIN 3 OF V17.
 NC-NO CONNECTION.
 TP-TIE POINT.



TUBE PLACEMENT CHART

TUBE PLACEMENT CHART



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 - V19

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V6, V20

Has pic, no sound - V7, V8, V9, V10

SYNC FAILURE

No vert. sync - V11, V12

No horiz. sync - V11, V14, V15

No vert. or horiz. sync - V11

SWEEP FAILURE

No raster, has sound - V15, V16, V17, V18, V20

No vertical deflection - V12, V13

Poor vert. linearity or foldover - V12, V13

Poor horiz. linearity or foldover - V15, V16, V17

Narrow picture - V15, V16, V17, V18, V19

Vert. off freq. - V11, V12

Horiz. off freq. - V11, V14, V15

HOFFMAN MODELS 78170, U, 78182P, P2, 7M169, U, 7M181P, P2, 7M181P, U, 21B173, U, 21B176, S, U, 21B184, U, 21B185P, 21B188, U, U2, 21B191, C2, U, U2, 21B358, P, U, 21B360, 21B361U, U2, 21K186, U, U2, 21M172, U, 21M175, S, U, 21M183, P, U, 21M184P, 21M187, U, U2, 21M190, C2, U, U2, 21M557, P, U, 21M560, U, U2, 21P177, S, U, 21P185, 21P192, C2, U, U2, 21P359, P, U, 21P362, U, U2, 21J205S, U, 21W190, C2, U, U2, 21W360, U, U2, 21-189, U, U2 (Ch. 303-17, -21, 306-21, -21B, -21U, 307-21, 308-21, 309-21, -21U, -21U2, 309A-21, -21U, -21U2, 310-21, -21C2, -21U, -21U2)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Switch the tuner between any two channels so that the detent roller sets on one of the high points of the drum disc. This will disable the local oscillator and reduce the possibility of erroneous indications.
Do not remove V15 to eliminate the high voltage shock hazard.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1. .005MFD	High side to point Δ . Low side to chassis.	4.5MC (Unmod.)	Any	DC probe thru 10K Ω to point Δ . Common to chassis.	A1, A2	Attenuate signal level to obtain 5 volts on VTVM. Adjust for maximum deflection.
2. "	"	"	"	DC probe to point Δ . Common to point Δ .	A3	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Repeat steps 1 and 2 until readings do not change.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

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

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1. .005MFD	High side to point Δ . Low side to chassis.	4.5MC (450KC Swp)	Any	Vert. Amp. thru 10K Ω to point Δ . Low side to chassis.	A1, A2	Disconnect stabilizing capacitor C2A. Adjust A1 and A2 for curve of maximum amplitude and symmetry similar to Fig. 1.
2. "	"	"	"	Vert. Amp. thru 10K Ω to point Δ . Low side to chassis.	A3	Reconnect stabilizing capacitor C2A. Adjust so that 4.5MC occurs at crossover lines as in Fig. 2. SLIGHTLY retouch A2 for maximum amplitude and straightness of crossover lines.

4.5MC TRAP ALIGNMENT

Turn the contrast control fully clockwise.

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
3. .005MFD	High side to point Δ . Low side to chassis.	4.5MC (Unmod.)	Any	DC probe to pin 11 of picture tube thru detector (Fig. 3). Common to chassis.	A4	Adjust for MINIMUM deflection.

VIDEO IF ALIGNMENT

Turn the contrast control fully clockwise. Connect the negative lead of a 3 volt battery to the ungrounded side of C40. Connect the positive lead to chassis. Attenuate generator output as low as possible to obtain readings.

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
4. Direct	High side to ungrounded tube shield floating over converter tube (V2). Low side to chassis.	41.25MC (Unmod.)	Between any two channels	DC probe to point Δ . Common to chassis.	A5	Adjust for MINIMUM deflection.
5. "	"	47.25MC	"	"	A6	"
6. "	"	44.0MC	"	"	A7	Adjust for maximum deflection.
7. "	"	45.4MC	"	"	A8	"
8. "	"	43.25MC	"	"	A9	"
9. "	"	43.0MC	"	"	A10	Adjust A10 for MINIMUM deflection.
10. "	"	43.0MC	"	"	A11	Adjust for maximum deflection.
11. "	"	45.0MC	"	"	A10	Readjust A10 for maximum deflection. Repeat steps 4 thru 11 until readings do not change.

OVERALL VIDEO IF RESPONSE CHECK

Connect a .001MFD capacitor across the vertical input terminal on scope. 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.

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12. Direct	High side to ungrounded tube shield floating over converter tube. Low side to chassis.	43.5MC (10MC Swp.)	41.25MC 42.5MC 45.75MC 47.25MC	Set channel selector between any two channels	Vert. Amp. thru 10K Ω to point Δ . Low side to chassis.	Check for response curve similar to Fig. 4. Use high scope gain and sweep generator output. Remove bias battery to view trap markers. If necessary, retouch A7 thru A11 for desired response. Bandpass should be approximately 3.25MC. Adjust A8 to place 45.75MC at 50% on response curve. Adjust A9 to place 42.5 at 50% on low frequency side of response curve. Adjust A7 to eliminate tilt on response curve. If necessary, SLIGHTLY retouch A5 and A6 to place 41.25MC and 45.75MC markers in trap notch as in Fig. 4.

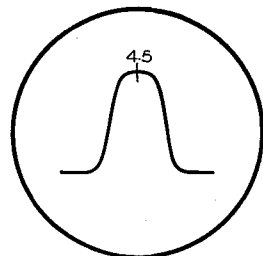


FIG. 1

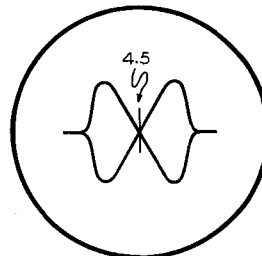


FIG. 2

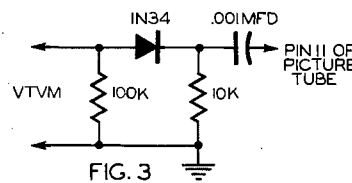


FIG. 3

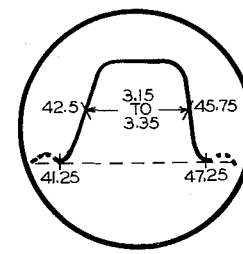


FIG. 4

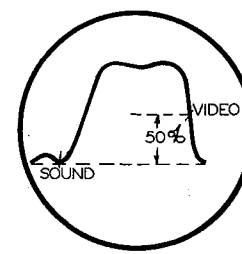


FIG. 5

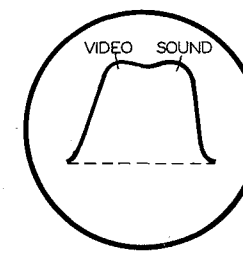


FIG. 6

ALIGNMENT INSTRUCTIONS (cont)

VHF OSCILLATOR ALIGNMENT

Complete oscillator alignment may not be necessary in tuners 9858, 9838, 9829 and 9843. If the oscillator seems to be off frequency approximately the same amount for a majority of the channels, it may be possible to correct them in one step using A12. It should be noted that this is an all channel adjustment and should not be used to correct any individual channel. If adjustment of A15 will not bring all channels well within the range of the fine tuning control (in the above tuners) it will be necessary to adjust the channel strip adjustment screw for each channel that is off frequency. Leave bias connected as under "Video IF Alignment". The channel oscillator adjustment screws are reached through a hole just to the right of the channel selector switch shaft. 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 Ω . Set the fine tuning control to the mid-position of its range.

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13. Two 120 Ω Carbon Resistors	Across VHF antenna terminals with 120 Ω in each lead.	213MC (10MC Swp.) 207MC (10MC Swp.) 201MC (10MC Swp.) 195MC (10MC Swp.) 189MC (10MC Swp.) 183MC (10MC Swp.) 177MC (10MC Swp.) 85MC (10MC Swp.) 79MC (10MC Swp.) 69MC (10MC Swp.) 63MC (10MC Swp.) 57MC (10MC Swp.)	211.25MC 215.75MC 209.75MC 203.75MC 197.75MC 191.75MC 185.75MC 179.75MC 83.25MC 87.75MC 81.75MC 75.75MC 69.75MC 63.75MC 57.75MC 51.75MC	13 12 11 10 9 8 7 6 5 4 3 2	Vert. Amp. thru 10K Ω to point Δ . Low side to chassis.	Adjust to place sound marker in trap notch as shown in Fig. 5. Video marker should be at 50%.

VHF RF AND MIXER ALIGNMENT

Leave bias connected 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 Ω .

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
14. Two 120 Ω Carbon Resistors	Across VHF antenna terminals with 120 Ω in each lead.	207MC (10MC Swp.)	205.25MC 209.75MC	12	Vert. Amp. thru 10K Ω to point Δ . Low side to chassis.	A25, A26, A27
15. "	"	213MC (10MC Swp.) 201MC (10MC Swp.) 195MC (10MC Swp.) 189MC (10MC Swp.) 183MC (10MC Swp.) 177MC (10MC Swp.) 85MC (10MC Swp.) 79MC (10MC Swp.) 69MC (10MC Swp.) 63MC (10MC Swp.) 57MC (10MC Swp.)	211.25MC 215.75MC 203.75MC 197.75MC 191.75MC 185.75MC 179.75MC 83.25MC 87.75MC 81.75MC 75.75MC 69.75MC 63.75MC 57.75MC 51.75MC	13 11 10 9 8 7 6 5 4 3 2	"	Adjust for response curve similar to Fig. 6 with markers above 90%. If markers fall below 70% on any one channel, make compromise adjustments of A25, A26, and A27 with channel selector set to that channel. Check all other channels to see that they have not been seriously affected.

43.5MC TRAP ALIGNMENT

Adjust the 43.5MC trap adjustment A28 for MINIMUM interference on channel 2.

UHF TUNER ALIGNMENT

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

HOFFMAN MODELS 78170, U, 78182P, P2, 78186, U, 78187P, P2, 78188, U, 78189, U, 78190, U, 78191, U, 78192, U, 78193, U, 78194, U, 78195, U, 78196, U, 78197, U, 78198, U, 78199, U, 78200, U, 78201, U, 78202, U, 78203, U, 78204, U, 78205, U, 78206, U, 78207, U, 78208, U, 78209, U, 78210, U, 78211, U, 78212, U, 78213, U, 78214, U, 78215, U, 78216, U, 78217, U, 78218, U, 78219, U, 78220, U, 78221, U, 78222, U, 78223, U, 78224, U, 78225, U, 78226, U, 78227, U, 78228, U, 78229, U, 78230, U, 78231, U, 78232, U, 78233, U, 78234, U, 78235, U, 78236, U, 78237, U, 78238, U, 78239, U, 78240, U, 78241, U, 78242, U, 78243, U, 78244, U, 78245, U, 78246, U, 78247, U, 78248, U, 78249, U, 78250, U, 78251, U, 78252, U, 78253, U, 78254, U, 78255, U, 78256, U, 78257, U, 78258, U, 78259, U, 78260, U, 78261, U, 78262, U, 78263, U, 78264, U, 78265, U, 78266, U, 78267, U, 78268, U, 78269, U, 78270, U, 78271, U, 78272, U, 78273, U, 78274, U, 78275, U, 78276, U, 78277, U, 78278, U, 78279, U, 78280, U, 78281, U, 78282, U, 78283, U, 78284, U, 78285, U, 78286, U, 78287, U, 78288, U, 78289, U, 78290, U, 78291, U, 78292, U, 78293, U, 78294, U, 78295, U, 78296, U, 78297, U, 78298, U, 78299, U, 78300, U, 78301, U, 78302, U, 78303, U, 78304, U, 78305, U, 78306, U, 78307, U, 78308, U, 78309, U, 78310, U, 78311, U, 78312, U, 78313, U, 78314, U, 78315, U, 78316, U, 78317, U, 78318, U, 78319, U, 78320, U, 78321, U, 78322, U, 78323, U, 78324, U, 78325, U, 78326, U, 78327, U, 78328, U, 78329, U, 78330, U, 78331, U, 78332, U, 78333, U, 78334, U, 78335, U, 78336, U, 78337, U, 78338, U, 78339, U, 78340, U, 78341, U, 78342, U, 78343, U, 78344, U, 78345, U, 78346, U, 78347, U, 78348, U, 78349, U, 78350, U, 78351, U, 78352, U, 78353, U, 78354, U, 78355, U, 78356, U, 78357, U, 78358, U, 78359, U, 78360, U, 78361, U, 78362, U, 78363, U, 78364, U, 78365, U, 78366, U, 78367, U, 78368, U, 78369, U, 78370, U, 78371, U, 78372, U, 78373, U, 78374, U, 78375, U, 78376, U, 78377, U, 78378, U, 78379, U, 78380, U, 78381, U, 78382, U, 78383, U, 78384, U, 78385, U, 78386, U, 78387, U, 78388, U, 78389, U, 78390, U, 78391, U, 78392, U, 78393, U, 78394, U, 78395, U, 78396, U, 78397, U, 78398, U, 78399, U, 78400, U, 78401, U, 78402, U, 78403, U, 78404, U, 78405, U, 78406, U, 78407, U, 78408, U, 78409, U, 78410, U, 78411, U, 78412, U, 78413, U, 78414, U, 78415, U, 78416, U, 78417, U, 78418, U, 78419, U, 78420, U, 78421, U, 78422, U, 78423, U, 78424, U, 78425, U, 78426, U, 78427, U, 78428, U, 78429, U, 78430, U, 78431, U, 78432, U, 78433, U, 78434, U, 78435, U, 78436, U, 78437, U, 78438, U, 78439, U, 78440, U, 78441, U, 78442, U, 78443, U, 78444, U, 78445, U, 78446, U, 78447, U, 78448, U, 78449, U, 78450, U, 78451, U, 78452, U, 78453, U, 78454, U, 78455, U, 78456, U, 78457, U, 78458, U, 78459, U, 78460, U, 78461, U, 78462, U, 78463, U, 78464, U, 78465, U, 78466, U, 78467, U, 78468, U, 78469, U, 78470, U, 78471, U, 78472, U, 78473, U, 78474, U, 78475, U, 78476, U, 78477, U, 78478, U, 78479, U, 78480, U, 78481, U, 78482, U, 78483, U, 78484, U, 78485, U, 78486, U, 78487, U, 78488, U, 78489, U, 78490, U, 78491, U, 78492, U, 78493, U, 78494, U, 78495, U, 78496, U, 78497, U, 78498, U, 78499, U, 78500, U, 78501, U, 78502, U, 78503, U, 78504, U, 78505, U, 78506, U, 78507, U, 78508, U, 78509, U, 78510, U, 78511, U, 78512, U, 78513, U, 78514, U, 78515, U, 78516, U, 78517, U, 78518, U, 78519, U, 78520, U, 78521, U, 78522, U, 78523, U, 78524, U, 78525, U, 78526, U, 78527, U, 78528, U, 78529, U, 78530, U, 78531, U, 78532, U, 78533, U, 78534, U, 78535, U, 78536, U, 78537, U, 78538, U, 78539, U, 78540, U, 78541, U, 78542, U, 78543, U, 78544, U, 78545, U, 78546, U, 78547, U, 78548, U, 78549, U, 78550, U, 78551, U, 78552, U, 78553, U, 78554, U, 78555, U, 78556, U, 78557, U, 78558, U, 78559, U, 78560, U, 78561, U, 78562, U, 78563, U, 78564, U, 78565, U, 78566, U, 78567, U, 78568, U, 78569, U, 78570, U, 78571, U, 78572, U, 78573, U, 78574, U, 78575, U, 78576, U, 78577, U, 78578, U, 78579, U, 78580, U, 78581, U, 78582, U, 78583, U, 78584, U, 78585, U, 78586, U, 78587, U, 78588, U, 78589, U, 78590, U, 78591, U, 78592, U, 78593, U, 78594, U, 78595, U, 78596, U, 78597, U, 78598, U, 78599, U, 78600, U, 78601, U, 78602, U, 78603, U, 78604, U, 78605, U, 78606, U, 78607, U, 78608, U, 78609, U, 78610, U, 78611, U, 78612, U, 78613, U, 78614, U, 78615, U, 78616, U, 78617, U, 78618, U, 78619, U, 78620, U, 78621, U, 78622, U, 78623, U, 78624, U, 78625, U, 78626, U, 78627, U, 78628, U, 78629, U, 78630, U, 78631, U, 78632, U, 78633, U, 78634, U, 78635, U, 78636, U, 78637, U, 78638, U, 78639, U, 78640, U, 78641, U, 78642, U, 78643, U, 78644, U, 78645, U, 78646, U, 78647, U, 78648, U, 78649, U, 78650, U, 78651, U, 78652, U, 78653, U, 78654, U, 78655, U, 78656, U, 78657, U, 78658, U, 78659, U, 78660, U, 78661, U, 78662, U, 78663, U, 78664, U, 78665, U, 78666, U, 78667, U, 78668, U, 78669, U, 78670, U, 78671, U, 78672, U, 78673, U, 78674, U, 78675, U, 78676, U, 78677, U, 78678, U, 78679, U, 78680, U, 78681, U, 78682, U, 78683, U, 78684, U, 78685, U, 78686, U, 78687, U, 78688, U, 78689, U, 78690, U, 78691, U, 78692, U, 78693, U, 78694, U, 78695, U, 78696, U, 78697, U, 78698, U, 78699, U, 78700, U, 78701, U, 78702, U, 78703, U, 78704, U, 78705, U, 78706, U, 78707, U, 78708, U, 78709, U, 78710, U, 78711, U, 78712, U, 78713, U, 78714, U, 78715, U, 78716, U, 78717, U, 78718, U, 78719, U, 78720, U, 78721, U, 78722, U, 78723, U, 78724, U, 78725, U, 78726, U, 78727, U, 78728, U, 78729, U, 78730, U, 78731, U, 78732, U, 78733, U, 78734, U, 78735, U, 78736, U, 78737, U, 78738, U, 78739, U, 78740, U, 78741, U, 78742, U, 78743, U, 78744, U, 78745, U, 78746, U, 78747, U, 78748, U, 78749, U, 78750, U, 78751, U, 78752, U, 78753, U, 78754, U, 78755, U, 78756, U, 78757, U, 78758, U, 78759, U, 78760, U, 78761, U, 78762, U, 78763, U, 78764, U, 78765, U, 78766, U, 78767, U, 78768, U, 78769, U, 78770, U, 78771, U, 78772, U, 78773, U, 78774, U, 78775, U, 78776, U, 78777, U, 78778, U, 78779, U, 78780, U, 78781, U, 78782, U, 78783, U, 78784, U, 78785, U, 78786, U, 78787, U, 78788, U, 78789, U, 78790, U, 78791, U, 78792, U, 78793, U, 78794, U, 78795, U, 78796, U, 78797, U, 78798, U, 78799, U, 78800, U, 78801, U, 78802, U, 78803, U, 78804, U, 78805, U, 78806, U, 78807, U, 78808, U, 78809, U, 78810, U, 78811, U, 78812, U, 78813, U, 78814, U, 78815, U, 78816, U, 78817, U, 78818, U, 78819, U, 78820, U, 78821, U, 78822, U, 78823, U, 78824, U, 78825, U, 78826, U, 78827, U, 78828, U, 78829, U, 78830, U, 78831, U, 78832, U, 78833, U, 78834, U, 78835, U, 78836, U, 78837, U, 78838, U, 78839, U, 78840, U, 78841, U, 78842, U, 78843, U, 78844, U, 78845, U, 78846, U, 78847, U, 78848, U, 78849, U, 78850, U, 78851, U, 78852, U, 78853, U, 78854, U, 78855, U, 78856, U, 78857, U, 78858, U, 78859, U, 78860, U, 78861, U, 78862, U, 78863, U, 78864, U, 78865, U, 78866, U, 78867, U, 78868, U, 78869, U, 78870, U, 78871, U, 78872, U, 78873, U, 78874, U, 78875, U, 78876, U, 78877, U, 78878, U, 78879, U, 78880, U, 78881, U, 78882, U, 78883, U, 78884, U, 78885, U, 78886, U, 78887, U, 78888, U, 78889, U, 78890, U, 78891, U, 78892, U, 78893, U, 78894, U, 78895, U, 78896, U, 78897, U, 78898, U, 78899, U, 78900, U, 78901, U, 78902, U, 78903, U, 78904, U, 78905, U, 78906, U, 78907, U, 78908, U, 78909, U, 78910, U, 78911, U, 78912, U, 78913, U, 78914, U, 78915, U, 78916, U, 78917, U, 78918, U, 78919, U, 78920, U, 78921, U, 78922, U, 78923, U, 78924, U, 78925, U, 78926, U, 78927, U, 78928, U, 78929, U, 78930, U, 78931, U, 78932, U, 78933, U, 78934, U, 78935, U, 78936, U, 78937, U, 78938, U, 78939, U, 78940, U, 78941, U, 78942, U, 78943, U, 78944, U, 78945, U, 78946, U, 78947, U, 78948, U, 78949, U, 78950, U, 78951, U, 78952, U, 78953, U, 78954, U, 78955, U, 78956, U, 78957, U, 78958, U, 78959, U, 78960, U, 78961, U, 78962, U, 78963, U, 78964, U, 78965, U,