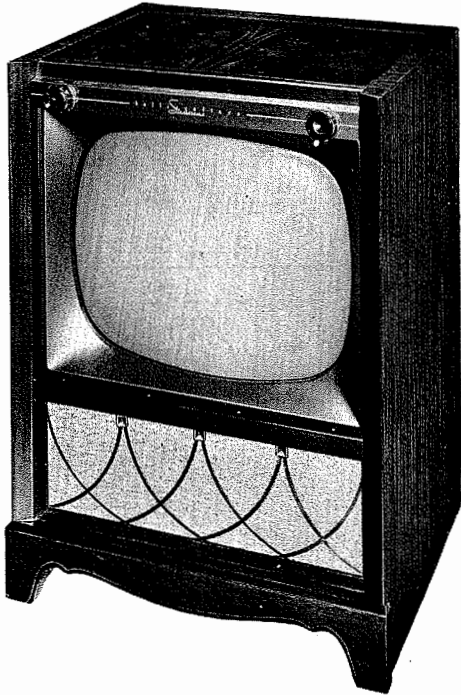


DISASSEMBLY INSTRUCTIONS

- CHASSIS REMOVAL**
1. Remove 4 push-on type control knobs from front panel of cabinet.
 2. Remove 3 wood screws holding metal name plate from front and remove 4 secondary control knobs now exposed.
 3. Remove 5 wood screws and 1 metal screws. Remove rear cover.
 4. Remove 2 bolts and 2 wood screws holding control and tuner assembly to inside front of cabinet.
 5. Disconnect picture tube socket, yoke plug, HV lead, speaker leads and ground wire.
 6. Remove 2 wood screws holding interlock and antenna terminal bracket.
 7. Remove 2 chassis bolts and 2 wood screws from chassis mounting bracket. Remove chassis with control and tuner assembly.
 8. Remove 6 speaker nuts holding 2 speakers. Remove speakers.



MODEL	CHASSIS
21KF520B, 21KF520M, 21KT540B, 21KT540M	A2000D
21KF521B, 21KF521M, 21KT541B, 21KT541M	B2000D
24KT550B, 24KT550M, 24TT510B, 24TT510M	C2000D
24KT551B, 24KT551M, 24TT511B, 24TT511M	D2000D

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 to the right of the channel selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

Remove 4 wood screws holding plastic molding at the bottom edge of the safety glass. Remove molding and safety glass. Use extreme caution when removing safety glass.

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

To adjust the horizontal oscillator, remove rear cover and supply power to the chassis. Set the horizontal hold control to the center of its range and adjust the horizontal frequency slug (L23) until the picture synchronizes horizontally.

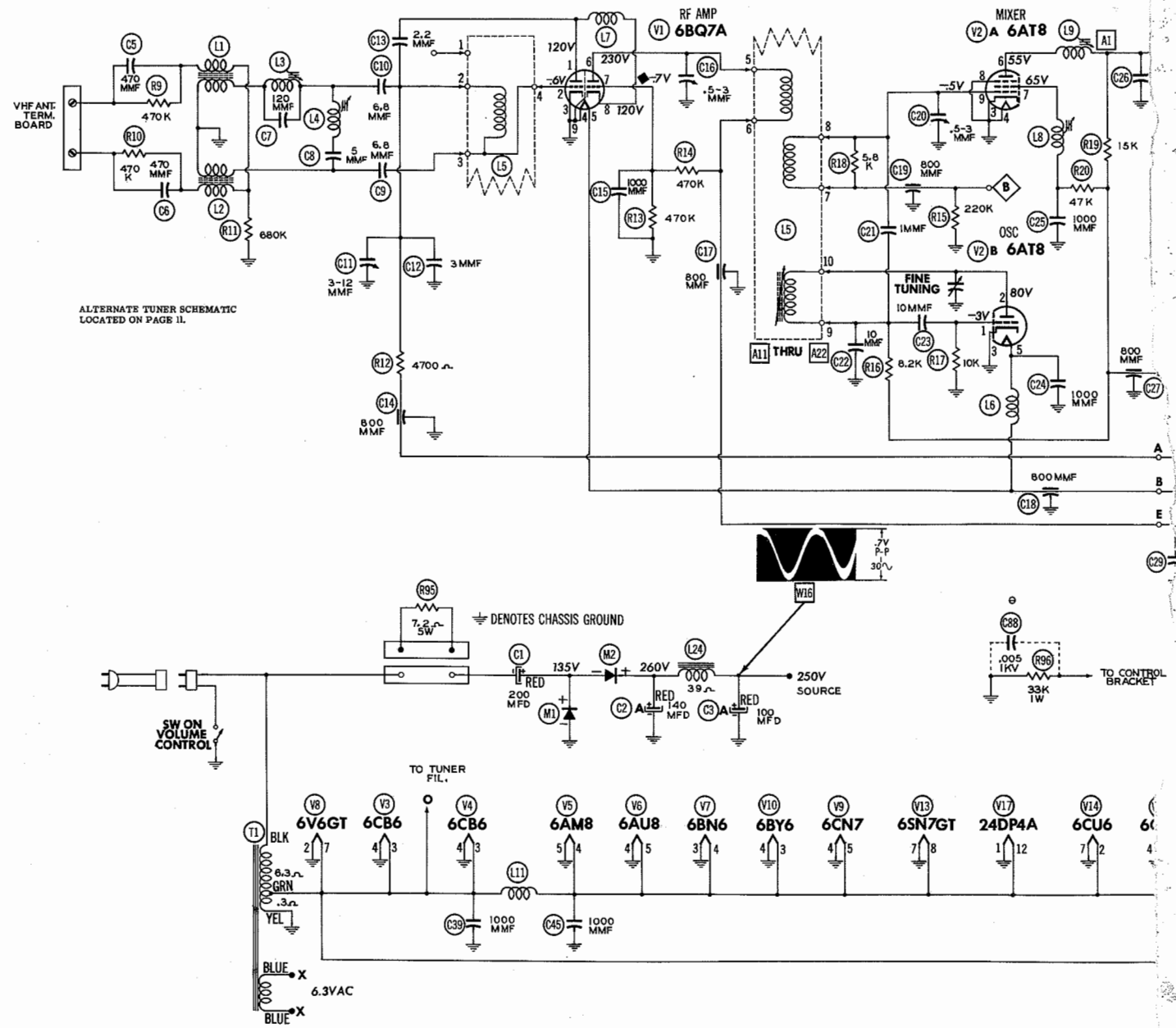
SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the buzz control (R8) for maximum volume and minimum buzz.

CENTERING

Centering is accomplished mechanically by adjusting the 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.

HALLICRAFTERS MODELS 21KF520B, M, 21KF521B, M, 21KT540B, M, 21KT541B, M, 24KT550B, M, 24KT551B, M, 24TT510B, M, 24TT511B, M (Ch. A2000D, B2000D, C2000D, D2000D)



◆ MEASURED FROM PIN 8 OF V1.

■ MEASURED FROM PIN 2 OF V4.

⊙ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

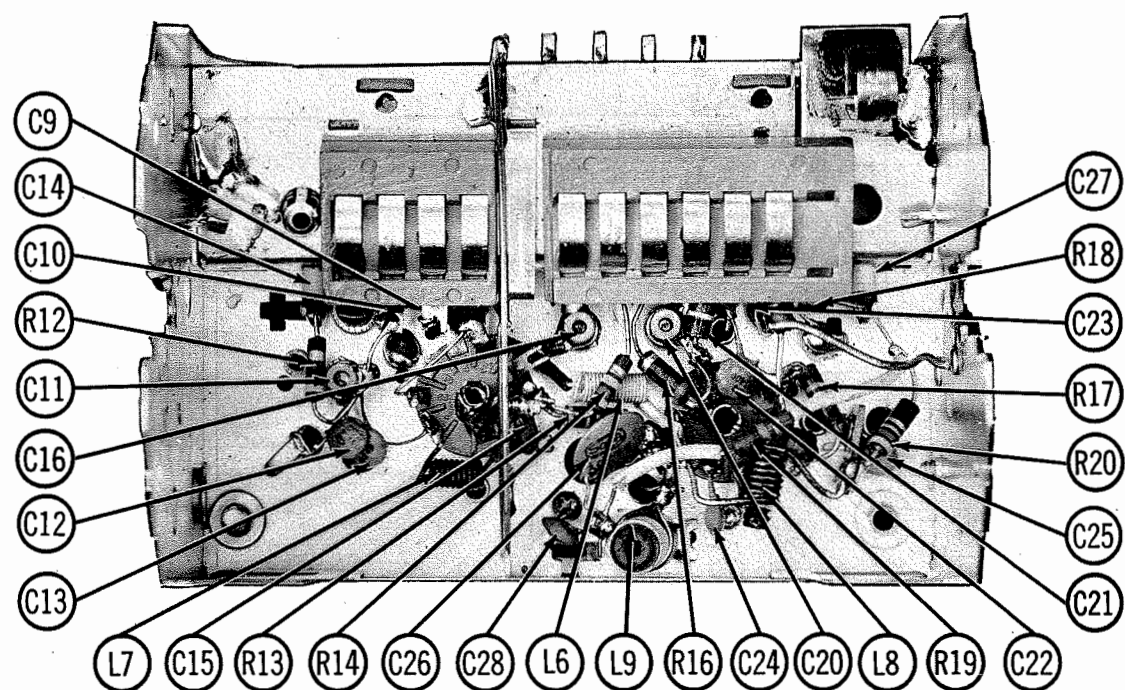
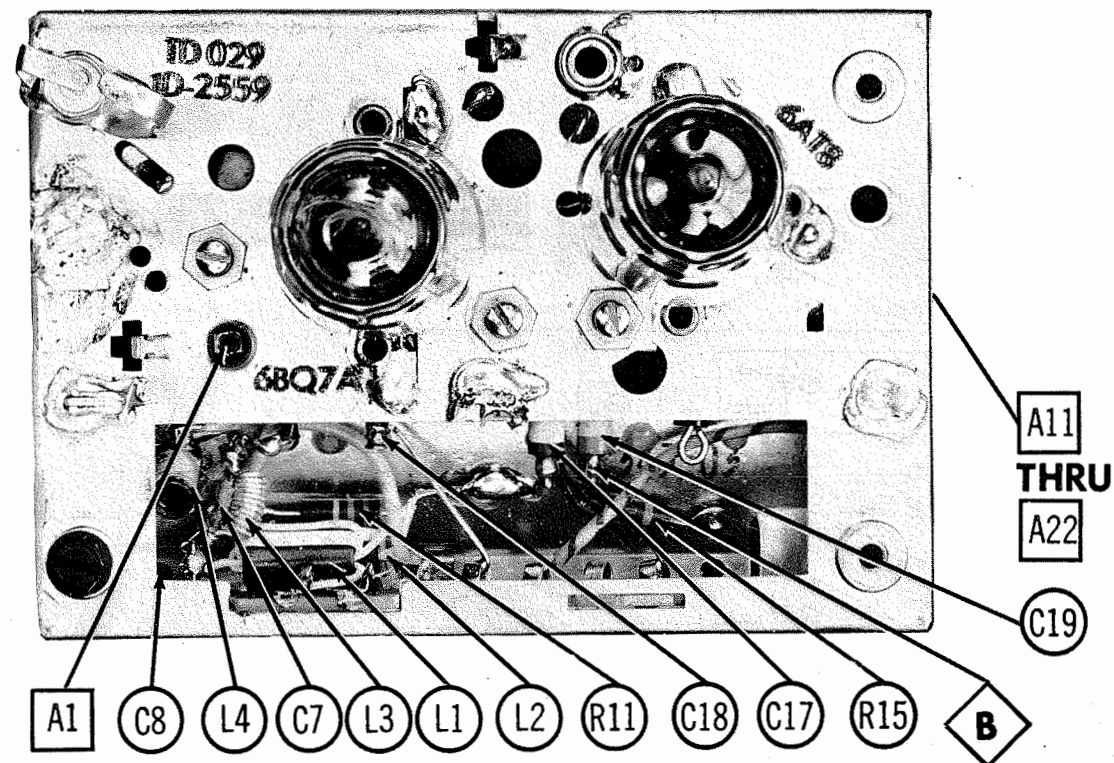
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM. (SEE PARTS LIST)

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

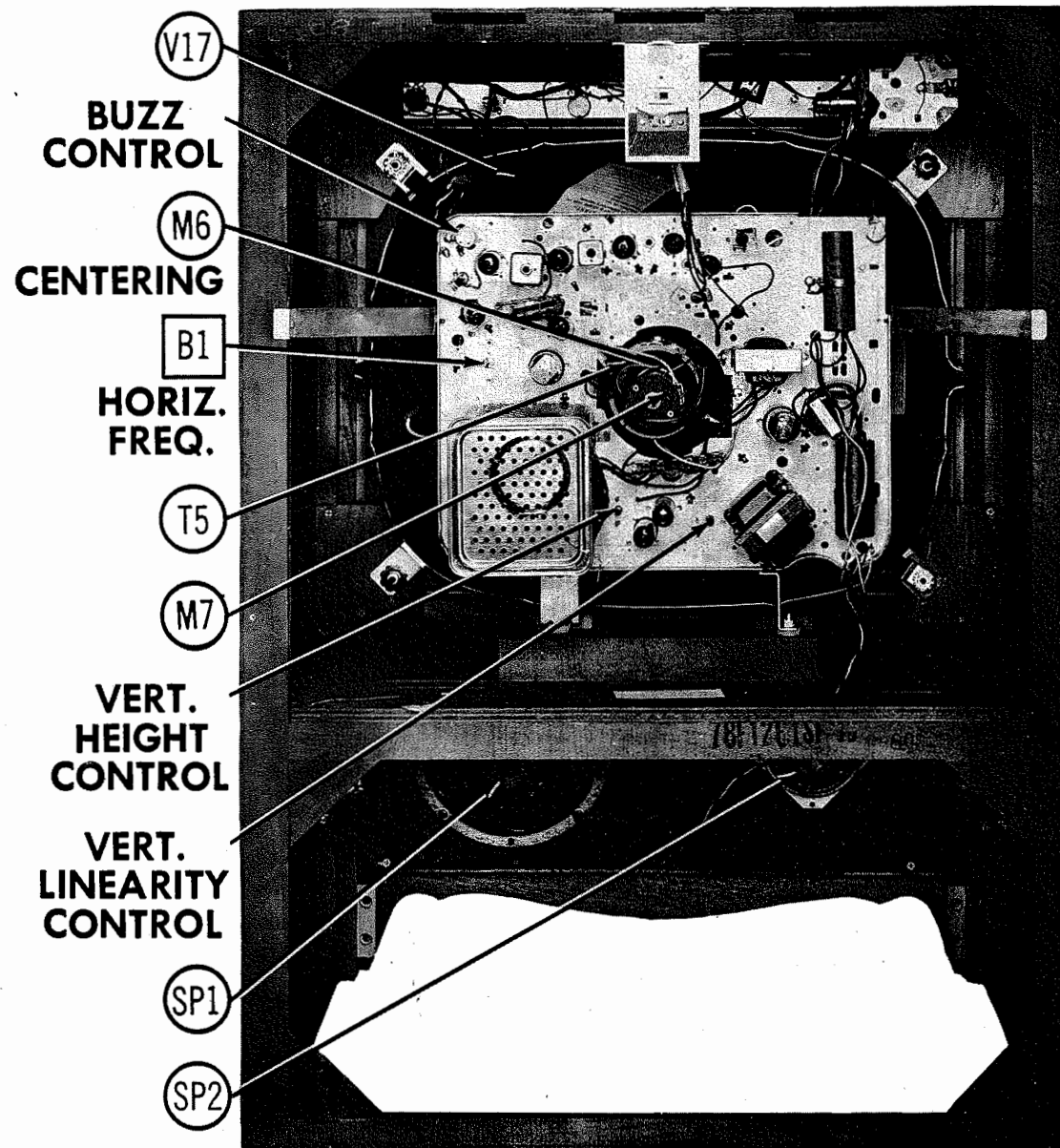
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE

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
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RF TUNER-BOTTOM VIEW



HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

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

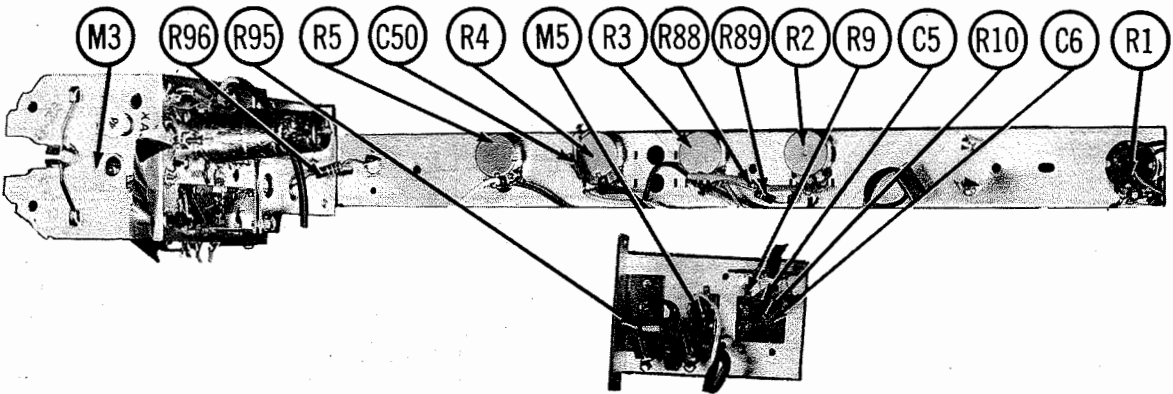
If the horizontal hold controls fail to maintain sync, set it in the middle of its range and adjust the horizontal frequency slug (B1) until the picture is in sync. Check other channels and if necessary, readjust B1 slightly for best sync on all channels.

PARTS LIST AND DESCRIPTIONS (Continued)
SELENIUM RECTIFIER

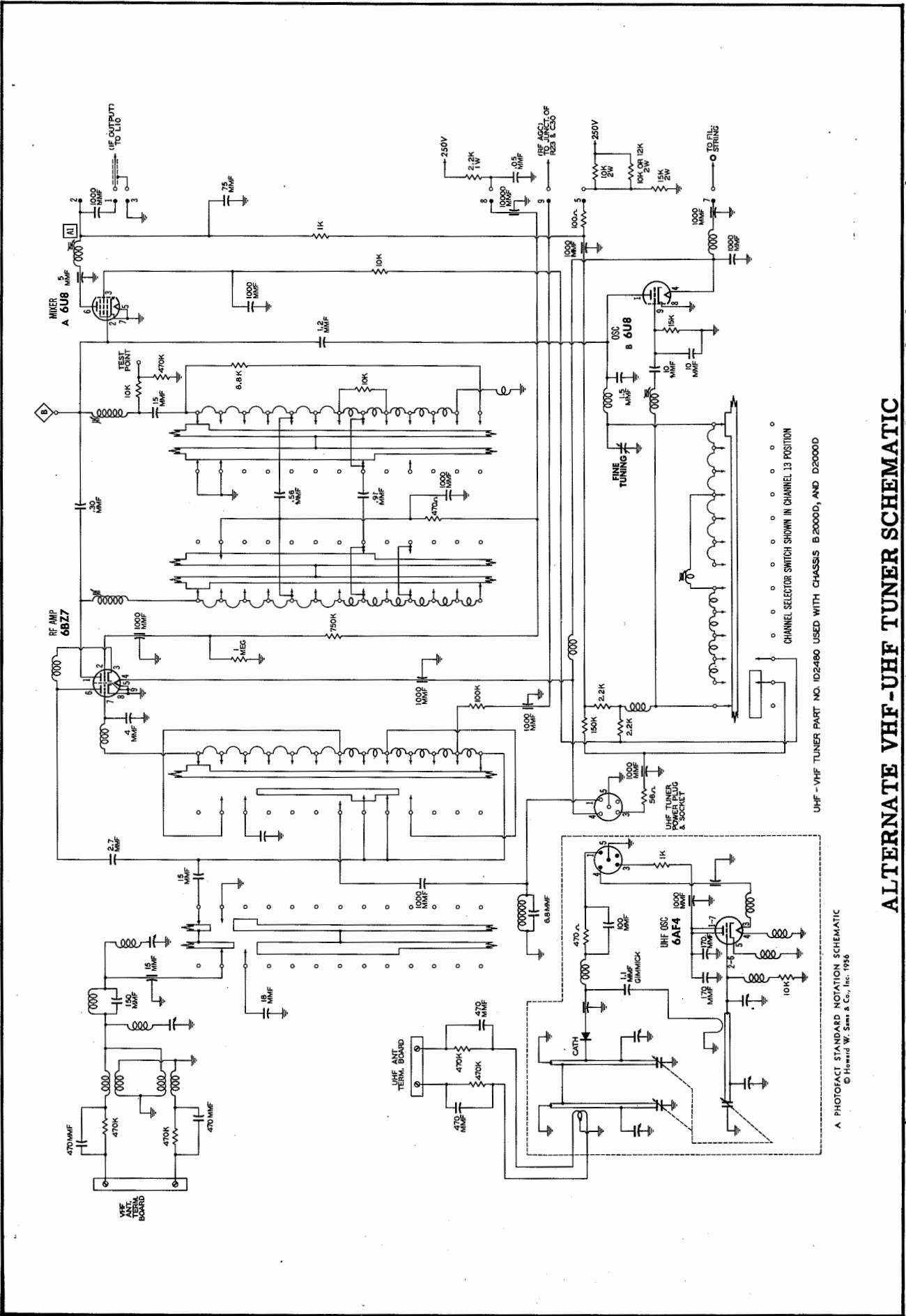
ITEM No.	RATING	REPLACEMENT DATA						NOTES
		Hallcrafters PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.230A	27A218-B	1236A	MR300	6S300	6Q4	300	
M2	.230A	27A218-B	1236A	MR300	6S300	6Q4	300	

MISCELLANEOUS

ITEM No.	PART NAME	Hallcrafters PART No.	NOTES
M3	Tuner	ID2559	VHF - Chassis A2000D, C2000D
M4	Tuner	ID2480	VHF-UHF - Chassis B2000D, D2000D
M5	Switch	60B737	Fringe (SPDT - Slide Type)
M6	Centering Device	21B216	
M7	Ion Trap	21B189	
	Cabinet	78-1259	Models 21KT540M, 21KT541M
	Cabinet	78-1260	Models 21KT540B, 21KT541B
	Cabinet	78-1257	Models 21KF521M, 21KF520M
	Cabinet	78-1258	Models 21KF521B, 21KF520B
	Cabinet	78-1255	Models 24TT510M, 24TT511M
	Cabinet	78-1256	Models 24TT510B, 24TT511B
	Cabinet	78-1261	Models 24KT551M, 24KT550M
	Cabinet	78-1262	Models 24KT551B, 24KT550B
	Knob	15C853	Horiz. Hold, Brightness, Contrast, Vert. Hold-Models 21KT540M, 21KT540B, 21KT541M, 21KT541B, 24TT510M, 24TT510B, 24TT511M, 24TT511B, 24KT551M, 24KT551B, 24KT550M, 24KT550B
	Knob	15A896	Horiz. Hold, brightness, contrast, vert. hold -Models 21KF521M, 21KF521B, 21KF520M, 21KF520B
	Knob	15C860	Fine Tuning - Models 21KT540M, 21KT540B, 21KF520M, 21KF520B, 24TT510M, 24TT510B, 24KT550M, 24KT550B
	Knob	15B858	Fine Tuning - Models 21KF521M, 21KT541M, 24TT511M, 24KT551M
	Knob	15B859	Fine Tuning - Models 21KF521B, 21KT541B, 24TT511B, 24KT551B
	Knob	15B916	On-Off-Volume - Models 21KT540M, 21KF520M, 24TT510M, 24KT550M
	Knob	15B917	On-Off-Volume - Models 21KT540B, 21KF520B, 24TT510B, 24KT550B
	Knob	15B918	On-Off-Volume - Models 21KF521M, 24TT511M, 24KT551M, 24KT541M
	Knob	15B919	On-Off-Volume - Models 21KF521B, 21KT541B, 24TT511B, 24KT551B
	Knob	15A920	VHF Channel Selector - Models 21KT541M, 24TT511M, 24KT551M
	Knob	15A921	VHF Channel Selector - Models 21KT541B, 24TT511B, 24KT551B
	Knob	15A928	VHF Channel Selector - Models 21KT540M, 24TT510M, 24KT550M
	Knob	15A929	VHF Channel Selector - Models 21KT540B, 24TT510B, 24KT550B
	Knob	15A930	VHF Channel Selector - Model 21KF520M
	Knob	15A931	VHF Channel Selector - Model 21KF520B
	Knob	15A922	VHF Channel Selector - Model 21KF521M
	Knob	15A923	VHF Channel Selector - Model 21KF521B
	Knob	15C860	UHF Tuning - Models 21KT541M, 21KT541B, 24TT511M, 24TT511B, 24KT551M, 24KT551B, 21KF521M, 21KF521B
	Knob	15C862	UHF-Calibrated - Models 21KT541M, 24TT511M, 24KT551M, 21KF521M
	Knob	15C863	UHF-Calibrated - Models 21KT541B, 24TT511B, 24KT551B, 21KF521B
	Mask	7D624	Models 21KT541M, 21KT540M
	Mask	7A627	Models 21KT541B, 21KT540B, 21KF520M, 21KF520B, 21KF521M, 21KF521B
	Mask	7D625	Models 24TT510M, 24TT511M, 24KT551M, 24KT550M
	Mask	7D628	Models 24TT510B, 24TT511B, 24KT551B, 24KT550B
	Safety Glass	22-502	Models 21KT541M, 21KT541B, 21KT540M, 21KT540B, 21KF520M, 21KF520B, 21KF521M, 21KF521B
	Safety Glass	22-503	Models 24TT510M, 24TT510B, 24TT511M, 24TT511B, 24KT551M, 24KT551B, 24KT550M, 24KT550B



TUNER & CONTROL ASSEMBLY



SET 321 FOLDER 6

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		Hallcrafters PART No.	STANDARD REPLACEMENT	
V1	RF Amp.	6BQ7A	6BQ7A	
V2	Mixer-Osc.	6AT8	6AT8	
V3	1st Video IF Amp.	6CB6	6CB6	
V4	2nd Video IF Amp.	6CB6	6CB6	
V5	Video Det.	6AM8	6AM8	
V6	Video Output-Sound IF Amp.	6AU8	6AU8	
V7	Audio Det.	6BN6	6BN6	
V8	Audio Output	6V6GT	6V6GT	
V9	Sync Amp.-Horiz. AFC	6CN7	6CN7	
V10	Sync Sep.	6BY6	6BY6	
V11	Vert. Osc.-Vert. Sync Amp.	6CG7	6CG7	
V12	Vert. Output	6S4A	6S4A	
V13	Horiz. Mult.	6SN7GT	6SN7GT	
V14	Horiz. Output	6CU6	6CU6	
V15	Damper	6AX4GT	6AX4GT	
V16	HV Rect.	1X2B	1X2B	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA				NOTES
	Hallcrafters PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	
V17	24DP4A ① 21ALP4A ①	24DP4A ① 21ALP4A ①	24DP4A ① 21ALP4A/B ①	24DP4A ② 21ALP4A/B ②	① Aluminized ② Silver screen "85"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	Hallcrafters PART No.	AEROVOX PART No.	CORNELL DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1	200	150	45B265	PR2-100	E210408	WS342	TD-200-200	D-100	R1467
C2A	140	300	45-327	RE-1031		WQ401		Q-225	R2185
B	4	300						T-030	
C	4	150							
D	50	150							
C3A	100	300	45-328	RE-1032	C152	FP389.1	TM-3137	T-537	R2184
B	100	300							
C	20	25							
C4	20	450	45B261	PRS450V20	BR2045	TC75	TD-20-450	FM-4520	TVA-1709

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	Hallcrafters PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.		
C5	470	500	47X20B471M	SI-470	D6-471	5W5T47	GP2K-471	MCL347	1FM-347		
C6	470	500	47X20B471M	SI-470	D6-471	5W5T47	GP2K-471	MCL347	1FM-347		
C7	120			NPO-D1120	DD-121	TZ-32	811-121	UC-5312	5GA-T12		
C8	8.8			NPO-D15	TCZ-4R7	Z01	NPOA-050	ZT-555	5TCCB-V47		
C9	8.8			NPO-D16.8	TCZ-6R8	Z013	NPOA-6R8	ZT-5568	5TCCB-V68		
C10	8.8			NPO-D16.8	TCZ-6R8	Z013	NPOA-6R8	ZT-5568	5TCCB-V68		
C11	3-12										
C12	3			NPO-D13	TCZ-3R3	Z007	NPOA-030	ZT-553	5TCCB-V3		
C13	2.2			NPO-S12.2	TCZ-2R2	Z006	NPOA-2R2		5TCCB-V22		
C14	800										
C15	1000			BPD-001	DD-102	K069	801-001	DC521	5HK-D1		
C16	.5-3				829-3		3139-01-0R5	CT565A			
C17	800										
C18	800										
C19	800										
C20	.5-3			NPO-S11	TCZ-1	TZ03	3139-01-0R5 NPOA-010	CT565A	5TCCB-V1		
C21	1										
C22	10										
C23	10										
C24	1000			BPD-001	DD-102	K069	801-001	DC521	5HK-D1		
C25	1000			BPD-001	DD-102	K069	801-001	DC521	5HK-D1		
C26	39			NPO-D139	TCZ-39	Z031	NPOL-390		5TCC-Q39		
C27	800										
C28	1000			BPD-001	DD-102	K069	801-001	DC521	5HK-D1		
C29	.05	400	46AU503J	BPD-005	DF-503	CUB455	PT415	4TM-S5			
C30	.1	150	46A243	P288N-1	DF-104	CUB2P1	PT201	2TM-P1			
C31	.5	100	46A177	P288N-5		CUB2P5	PT205	88P20			
C32	.1	150	46A243	P288N-1	DF-104	CUB2P1	PT205	2TM-P1			
C33	5000		47A168	BPD-005	DD-502	K069	811-005	5HK-D5			
C34	1000		47A230	BPD-001	DD-102	K069	801-001	DC521	5HK-D1		
C35	24		47CA20A240J	NPO-S125	TCZ-24	TZ15	NPOL-240	ZT5425	5TCC-Q25		
C36	.05	200		BPD-05	DF-503	CUB2S5	PT415	2TM-S5			
C37	1000		47A230	BPD-001	DD-102	K069	801-001	DC521	5HK-D1		
C38	1000		47A230	BPD-001	DD-102	K069	801-001	DC521	5HK-D1		
C39	1000		47A230	BPD-001	DD-102	K069	801-001	DC521	5HK-D1		
C40	39			NPO-D139	TCZ-39	TZ20	NPOL-390		5TCC-Q39		
C41	15		47CA20A150J	NPO-S139	TCZ-15	TZ11	NPOK-150		5TCC-Q15		
C42	1000		47A230	BPD-001	DD-102	K069	801-001	DC521	5HK-D1		
C43	1000		47A230	BPD-001	DD-102	K069	801-001	DC521	5HK-D1		
C44	5000		47A168	BPD-005	DD-502	K069	811-005	DC525	5HK-D5		
C45	1000		47A230	BPD-001	DD-102	K069	801-001	DC521	5HK-D1		
C46	10		47CA20100F	N750-S110	TCN-10	TN01	N750A-100	NT-541	5TCC-Q1		
C47	.1	150	46A243	P288N-1	DF-104	CUB2P1	PT201	2TM-P1			
C48	270		47X20D271K	NPO-S1270	DD-270	TZ39	811-271	PT1828	10GA-T27		
C49	.0082	400	46AU822E	P488N-008	D6-802	CUB18D8	811-561	PT1828	10GA-T56		
C50	560		47CA25A561K	1464-00068	D6-561	1R5T56	811-561				
C51	68		47B479								
C52	.1	400	46A1V104J	P488N-1	DF-104	CUB4P1	PT401	4TM-P1			
C53	5		47A160-8	NPO-S110	TCZ-4R7	Z011	NPOA-050	ZT-555	5TCCB-V47		
C54	33		47B476	N080-S133							
C55	47		47CA20A470M	SI-47	D6-470	TP29	GPIK-470	UC-5447	5GA-Q47		
C56	2.4		47-599	NPO-S12.2	TCZ-2R2	TZ05	NPOA-2R2		5TCCB-V22		
C57	1000		47A230	BPD-001	DD-102	K069	801-001	DC521	5HK-D1		
C58	15		47B480								
C59	1000		47A230	BPD-001	DD-102	K069	801-001	DC521	5HK-D1		
C60	1000		47A230	BPD-001	DD-102	K069	801-001	DC521	5HK-D1		
C61	470		47CA25A471M	SI-470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47		
C62	10000		47A224	BPD-01	DD-103	K082	811-01	DC511	5HK-S1		
C63	2000		47A224	BPD-002	DD-202	K072	801-002	DC522	5HK-D2		
C64	10000		47A224	BPD-01	DD-103	K082	811-01	DC511	5HK-S1		
C65	470		47CA25A471M	SI-470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47		
C66	.1	150	46A243	P288N-1	DF-104	CUB2P1	PT201	2TM-P1			
C67	10000		47A224	BPD-01	DD-103	K082	811-01	DC511	5HK-S1		

Note 1

PARTS LIST AND DESCRIPTIONS CAPACITORS (cont)

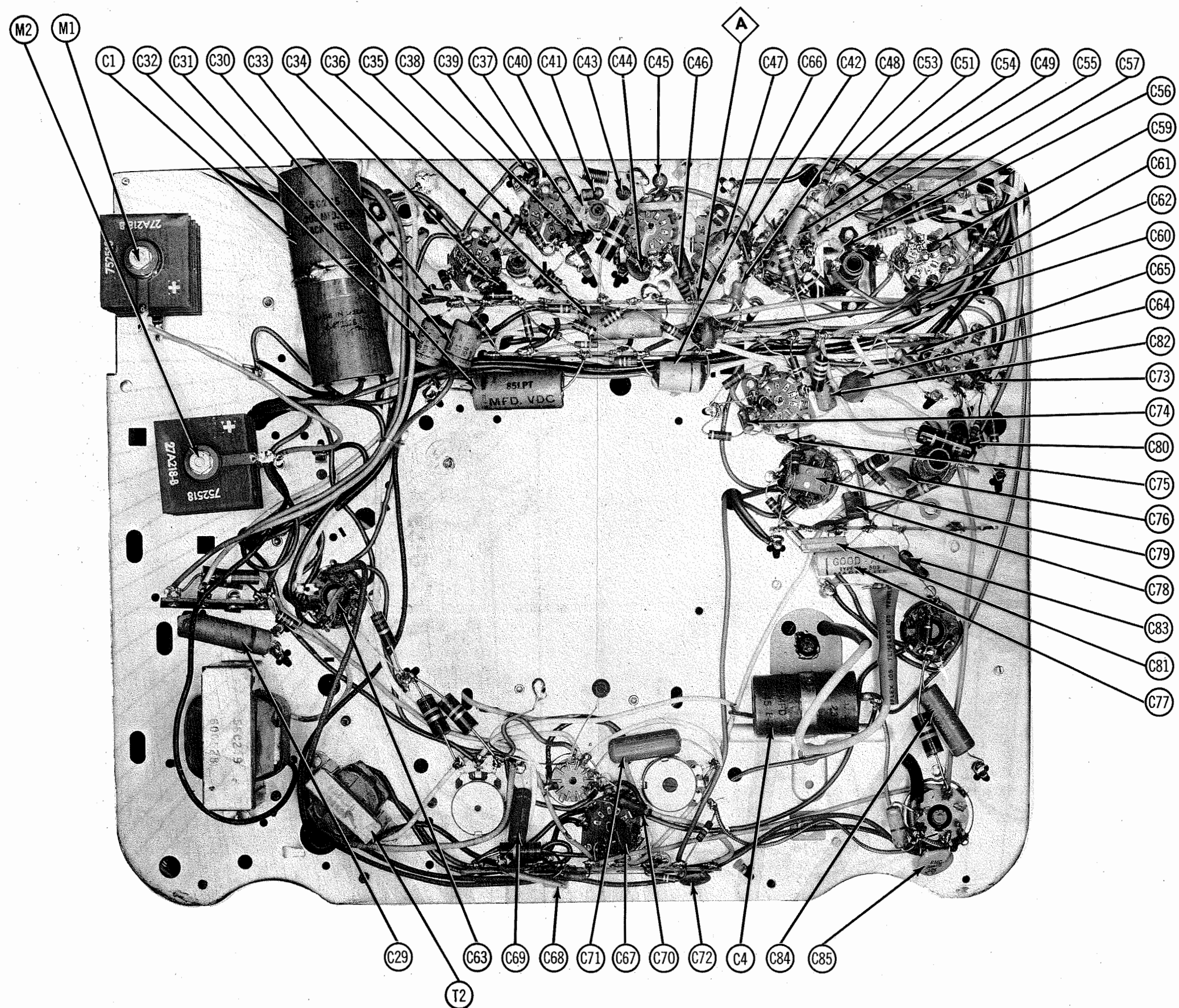
ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT.	Hallcrafters PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C68A	4700		† 48A044	PA-383	† PC-106	K079	811-0047	UC-5247	5HK-D47	
B	4700					K079	811-0047	UC-5247	5HK-D47	
C69	.01	400	46BR103E4	BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C70	470		47CA25A471M	1464-00047		5R5T47			MS-347	
C71	.047	400	46BR473E4	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C72	5000		47A188	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C73	68		47CA20A680M	SI-68	DD-680	TP32	GPIK-680	UC-5468	58A-Q68	
C74	75		47CA20A750K	NPO-S175	TCZ-75	TZ27	801-750	ZT-5475	5TCC-Q75	
C75	1000		47A588	BPD-001	DD-102	K089	801-001	DC521	5HK-D1	
C76	1000			BPD-001	DD-102	K089	801-001	DC521	5HK-D1	
C77	.1	400	46AT104J	P488N-1	DF-104	CUB4P1	PT401	4TM-P1	MS-31	
C78	100	500	47X20B101K	1469-0001	TCZ-100	22R571	NPO-337-101	MCB235	MS-327	
C79	270	500	47CA20A271K	1469-00027	TCZ-270	5R5T27	NPO-335-271		MS-239	
C80	.0039	400	46BR392E4	1464-0039		1R5D39			MS-368	
C81	680	500	47X20B681K	1464-00068	D6-681	1R5T68	811-681	GP3-333-682	MS-D68	
C82	.0068	400	46AU682E	BPD-0068	D6-682	CUB6D68	811-471		MS-347	
C83	470		47CA25A471M	1464-00047	D6-471	5R5T47		PT4147	4TM-S47	
C84	.047	400	46BR473L4	BPD-05	DF-503	CUB4S47				
C85	56	3000	47A555						4TM-S68	
C86	.068	200	46AU683F	P288N-068		CUB2S68		PT416	20GA-Q47	
C87	47	2000							IDHK-D47	
C88	.005	1000		HVD-15-4700	DD16-502	VD47	1R5K-472	PT1825		Note 2
C89	68	2000								Note 3

Note 1. Some versions may use a .02MFD @ 600V unit (Part No. 46AZ2033) in this application.
Note 2. Not used in some versions.
Note 3. Used in chassis B2000D and D2000D only.

† Items C68A, C68B, R73A, R73B are combined in one unit.

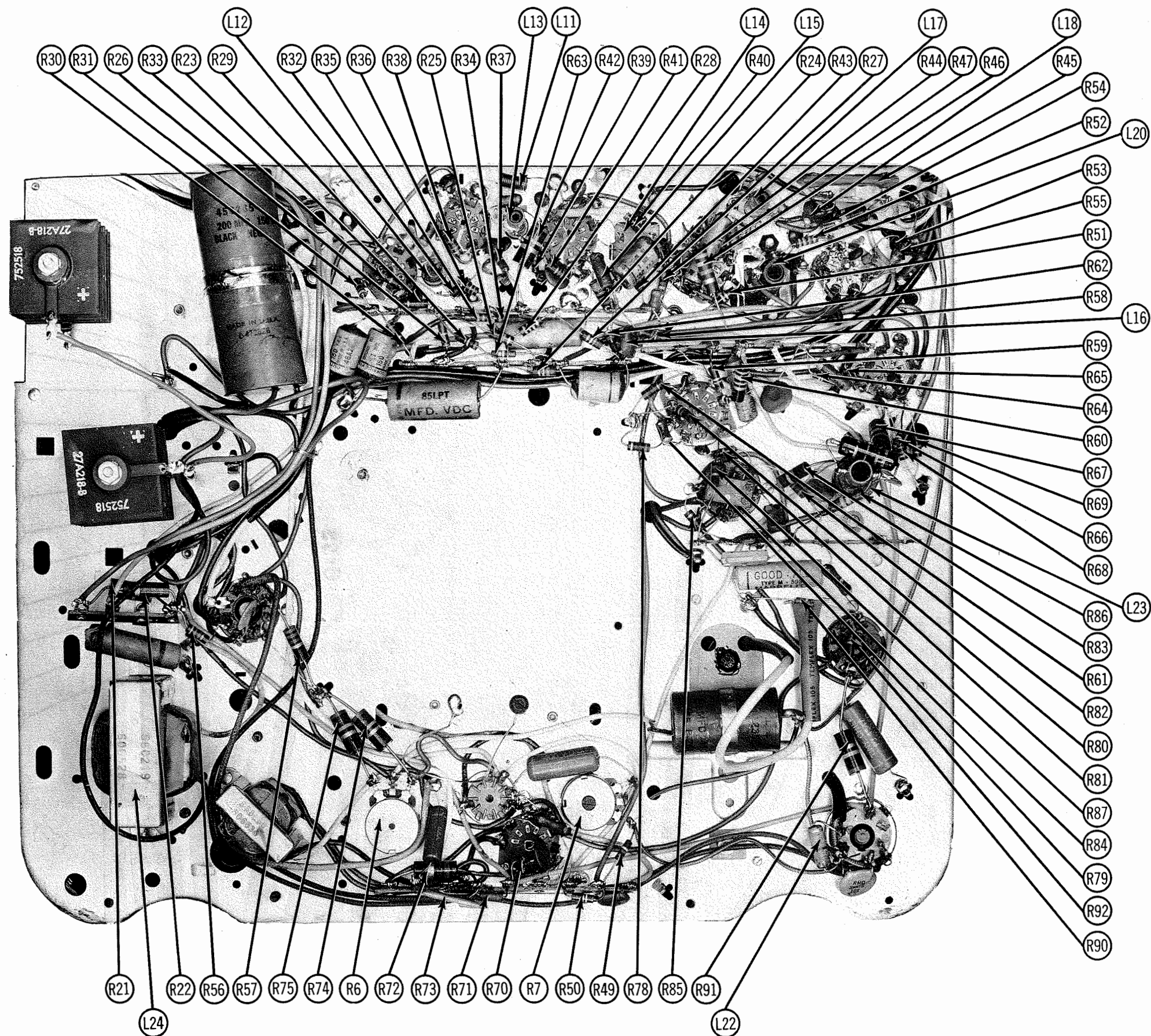
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESIST-ANCE	WATTS	Hallcrafters PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1Meg	$\frac{1}{2}$	25B1233	B-70-S	A47-1Meg-Z	Q13-187	U-53	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A.
C	Switch		Not Req.	Not Req.	SWE-12	78-1	US-26	Attach to R1A.
R2A	15KΩ	$\frac{1}{2}$	25B1232	AB-22	A47-15K-S	Q11-119	U-26	Horiz. Hold
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R2A.
R3	5Meg	$\frac{1}{2}$	25B1148			Q17-141		Brightness
R4	1400Ω		25B1234					Contrast Tapped at 1200Ω
R5A	1.25Meg	$\frac{1}{2}$	25B1177	† AB-89	† A47-1Meg-S	† Q11-137	† U-54	Vert. Hold
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R5A.
R6A	750Ω	$\frac{1}{2}$	25B1099	AB-5	A47-750-S	Q11-105	PTA751L	Vert. Linearity
B	Shaft		Not Req.	AK-19	RN-3	TQ	Not Req.	Attach to R6A.
R7A	5Meg	$\frac{1}{2}$	25B1098	* AB-86	* A47-4Meg-S	* Q11-141	* PTA355L	Height
B	Shaft		Not Req.	AK-19	RN-3	TQ	Not Req.	Attach to R7A.
R8	500Ω	2	25A1095		39-500			Buzz-Wire Wound



HALICRAFTERS MODELS 21KF520B, M, 21KF521B, M, 21KF540B, M, 21KF541B, M, 24KT550B,
 M, 24KT551B, M, 24TT510B, M, 24TT511B, M (Ch. A2000D, B2000D, C2000D, D2000D)

CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION



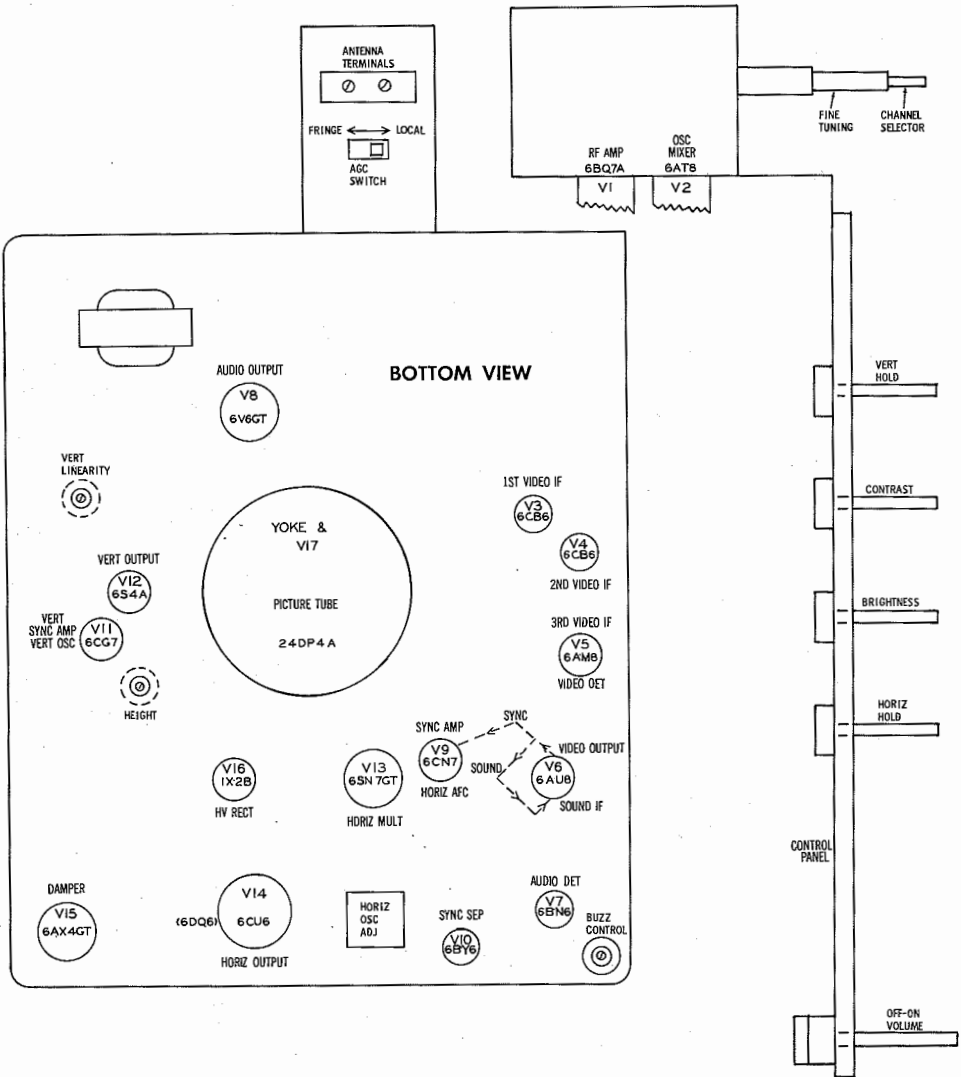
CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

HALLICRAFTERS MODELS 21KF520B, M, 21KF521B, M, 21KT540B, M, 21KT541B, M, 24KT550B, M, 24KT551B, M, 24TT510B, M, 24TT511B, M (Ch. A2000D, B2000D, C2000D, D2000D)

RESISTANCE MEASUREMENTS

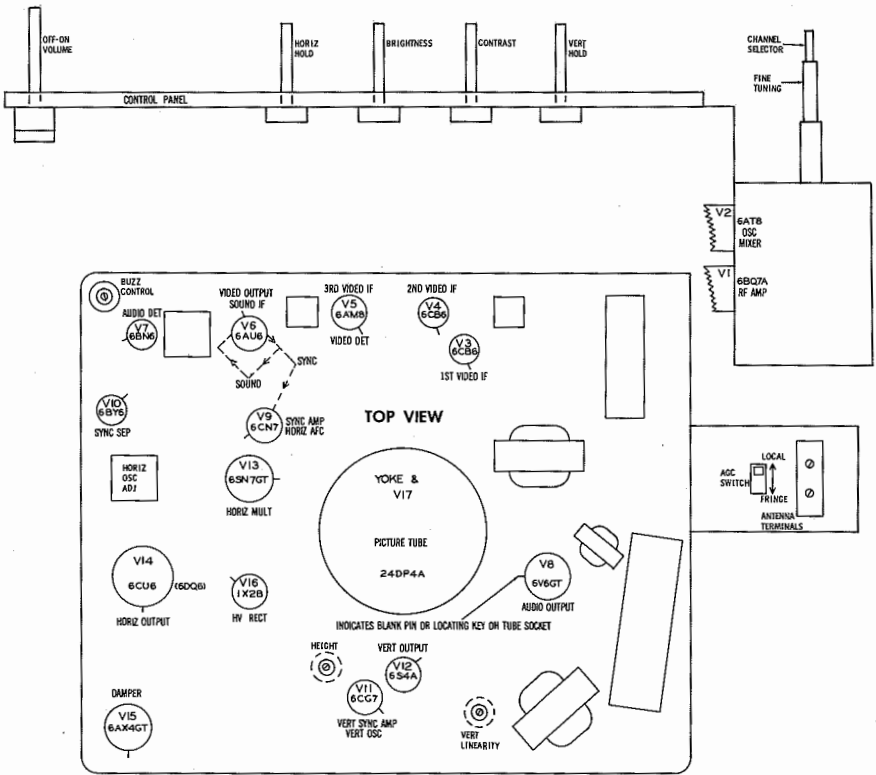
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7A	INF	3Meg	0Ω	0Ω	.1Ω	↑ 2.2KΩ	200KΩ	INF	0Ω
V 2	6AT8	10KΩ	↑ 17KΩ	0Ω	0Ω	.1Ω	↑ 27KΩ	↑ 60KΩ	0Ω	220KΩ
V 3	6CB6	1.5Meg	47Ω	.1Ω	0Ω	▲ 750Ω	▲ 750Ω	0Ω		
V 4	6CB6	90KΩ	INF	.1Ω	0Ω	↑ 1KΩ	↑ 1KΩ	0Ω		
V 5	6AM8	180Ω	12KΩ	↑ 12KΩ	.1Ω	0Ω	↑ 13KΩ	.2Ω	4.7KΩ	0Ω
V 6	6AU8	0Ω	100KΩ	↑ 55KΩ	0Ω	.1Ω	90Ω	1Meg	↑ 47KΩ	↑ 7.5KΩ
V 7	6BN6	300Ω	.3Ω	0Ω	.1Ω	↑ 22KΩ	5.3Ω	▲ 1Meg		
V 8	6V6GT	TP	0Ω	↑ 1.1KΩ	↑ 500Ω	500KΩ	NC	.1Ω	680Ω	
V 9	6CN7	4.7KΩ	2Meg	1Meg	0Ω	.1Ω	100Ω	8KΩ	↑ 39KΩ	0Ω
V 10	6BY6	300KΩ	0Ω	.1Ω	0Ω	↑ 120KΩ	↑ 25KΩ	1.5Meg		
V 11	6CG7	▲ 3Meg	450KΩ	0Ω	0Ω	.1Ω	↑ 9KΩ	1.2Meg	0Ω	0Ω
V 12	6S4A	NC	7KΩ	▲ 3Meg	0Ω	.1Ω	▲ 3Meg	NC	NC	▲ 1.3KΩ
V 13	6SN7GT	150KΩ	↑ 120KΩ	1KΩ	3Meg	↑ 15KΩ	11KΩ	0Ω	.1Ω	
V 14	6CU6	TP	.1Ω	NC	↑ 10KΩ	470KΩ	NC	0Ω	0Ω	TOP CAP ▲ 22Ω
V 15	6AX4GT	NC	TP	350KΩ	NC	↑ 39Ω	NC	350KΩ	350KΩ	
V 16	1X2B		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ▲ 220Ω
V 17	24DP4A	0Ω	0Ω	PIN 6 0Ω	PIN 10 ▲ 220KΩ	PIN 11 ↑ 300KΩ	PIN 12 .1Ω			

↑ MEASURED FROM OUTPUT OF M2.
▲ MEASURED FROM PIN 3 OF V15.
▲ MEASURED FROM PIN 2 OF V4.
TP-TIE POINT.
NC-NO CONNECTION.



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 - 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, V17
Has pic, no sound - V6, V7, V8

SYNC FAILURE
No vert. sync - V10, V11
No horiz. sync - V8, V10, V13
No vert. or horiz. sync - V9, V10

SWEEP FAILURE
No raster, has sound - V13, V14, V15, V18, V17
No vertical deflection - V11, V12
Poor vert. linearity or foldover - V11, V12
Poor horiz. linearity or foldover - V13, V14, V15
Narrow picture - V13, V14, V15, V18, M1, M2
Vert. off freq. - V10, V11
Horiz. off freq. - V10, V11

HALLICRAFTERS MODELS 21KF520B, M, 21KF521B, M, 21KF540B, M, 21KT541B, M, 24KT550B, M, 24KT551B, M, 24TT510B, M, 24TT511B, M (Ch. A2000D, B2000D, C2000D, D2000D)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use an isolation transformer to protect the test equipment.
The high voltage shock hazard may be eliminated by removing the 6AX4 (V15) damper tube and connecting a 2250 ohm 30 watt resistor from pin 5 of the 6AX4 to chassis.

VIDEO IF ALIGNMENT

Connect the negative lead of a 3 volt bias supply to the ungrounded side of C32. Connect the positive lead to chassis. Two peaks may occur during alignment of the video IF coils. Use the peak with the slug entering the coil from the end nearest the chassis. The sound trap (A5) should be tuned with the slug entering the coil from the end away from the chassis. Use only enough sweep generator output to provide usable pattern on scope. If the sweep generator has no built-in marker, loosely couple a separate marker to the sweep generator output. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1. .01MFD	High side to point Δ . Low side to chassis.	44MC (10MC Swp)	41.25MC 45.75MC	Between any two channels	Vert. Amp. thru detector probe (Fig. 1) to pin 5 (plate) of 1st. video IF amp. (V3). Low side to chassis.	A1, A2	Adjust A1 and A2 for response curve similar to Fig. 2 with markers in proper positions. Remove scope and detector from pin 5 of V3.
2. "	"	"	41.25MC 42.5MC 45.75MC	"	Vert. Amp. thru 3.3K Ω to point Δ . Low side to chassis.	A3, A4, A5, A6	Adjust for response curve similar to Fig. 3. Adjust A5 for MINIMUM amplitude at 41.25MC. A3 affects the high frequency end of the response curve and A4 affects the low frequency side. A6 affects the center of the response curve. Adjust A6 for maximum amplitude and MINIMUM tilt.

4.5MC TRAP ALIGNMENT

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
3. .001MFD	High side to point Δ . Low side to chassis.	Not used	4.5MC (400% Mod)	Between any two channels	Vert. Amp. thru detector (Fig. 4) to pin II (cathode) of picture tube. Low side to chassis.	A7	Turn contrast control fully clockwise. Adjust A8 completely out of coil. Then adjust A7 for MINIMUM 400% indication on scope.

SOUND IF ALIGNMENT

Set the volume control for normal volume. 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
4. .001MFD	High side to point Δ . Low side to chassis.	4.5MC (400% Mod) 50KC Swp	4.5MC	Between any two channels	Across secondary of audio output transformer	A10	Set buzz control (R8) 90° from maximum clockwise rotation. Adjust A10 for maximum 400% indication on scope.
5. "	"	"	"	"	"	A8, A9	Attenuate generator output so that signal level is below the limiting level of the 6BN6 as evidenced by background hiss and noise. Adjust A8 and A9 for maximum response on scope.
6. "	"	Not used	4.5MC (400% Mod)	"	"	R8	Use high generator output and adjust R8 for MINIMUM 400% indication on scope.
7. "	"	4.5MC (400% Mod) 50KC Swp	4.5MC	"	"	A10	With volume control at low level, retouch A10 for maximum 400% indication on scope. Remove test equipment. Connect antenna and tune in weakest station in that area and retouch R8 for MINIMUM buzz and hiss. Tune in strongest TV station in that area and adjust A10 for clearest sound.

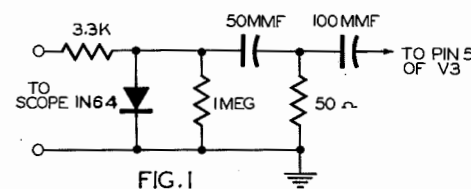


FIG. 1

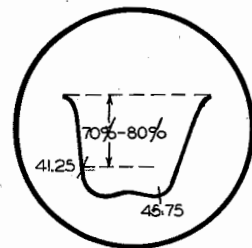


FIG. 2

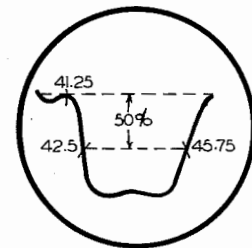


FIG. 3

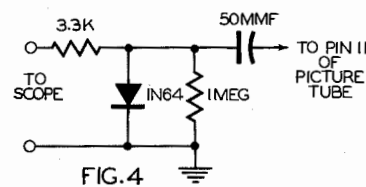


FIG. 4

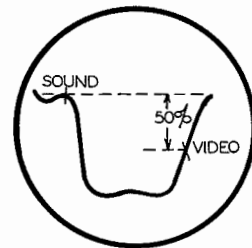


FIG. 5

ALIGNMENT INSTRUCTIONS (cont)

VHF OSCILLATOR ALIGNMENT FOR TUNER #1D2559

Leave the bias connected as under "Video IF Alignment". Remove the 2250 ohm resistor from the cathode circuit of V15 and replace the 6AX4 in its socket. The channel oscillator adjustment screws are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms. Set the fine tuning control to the mid-position of its range.

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8. Two 1200 Carbon Resistors	Across 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) 171MC (10MC Swp) 165MC (10MC Swp) 159MC (10MC Swp)	211.25MC 215.75MC 205.25MC 209.75MC 199.25MC 203.75MC 193.25MC 197.75MC 187.25MC 191.75MC 181.25MC 185.75MC 175.25MC 179.75MC 169.25MC 173.75MC 163.25MC 167.75MC 157.25MC 161.75MC 151.25MC 155.75MC 145.25MC 149.75MC	13 12 11 10 9 8 7 6 5 4 3 2	Vert. Amp. thru 3.3K Ω to point Δ . Low side to chassis.	A11 A12 A13 A14 A15 A16 A17 A18 A19 A20 A21 A22	Adjust to place sound markers in trap notch as in Fig. 5. Video marker should fall at 50%.

RF AND MIXER ALIGNMENT FOR TUNER #1D2559

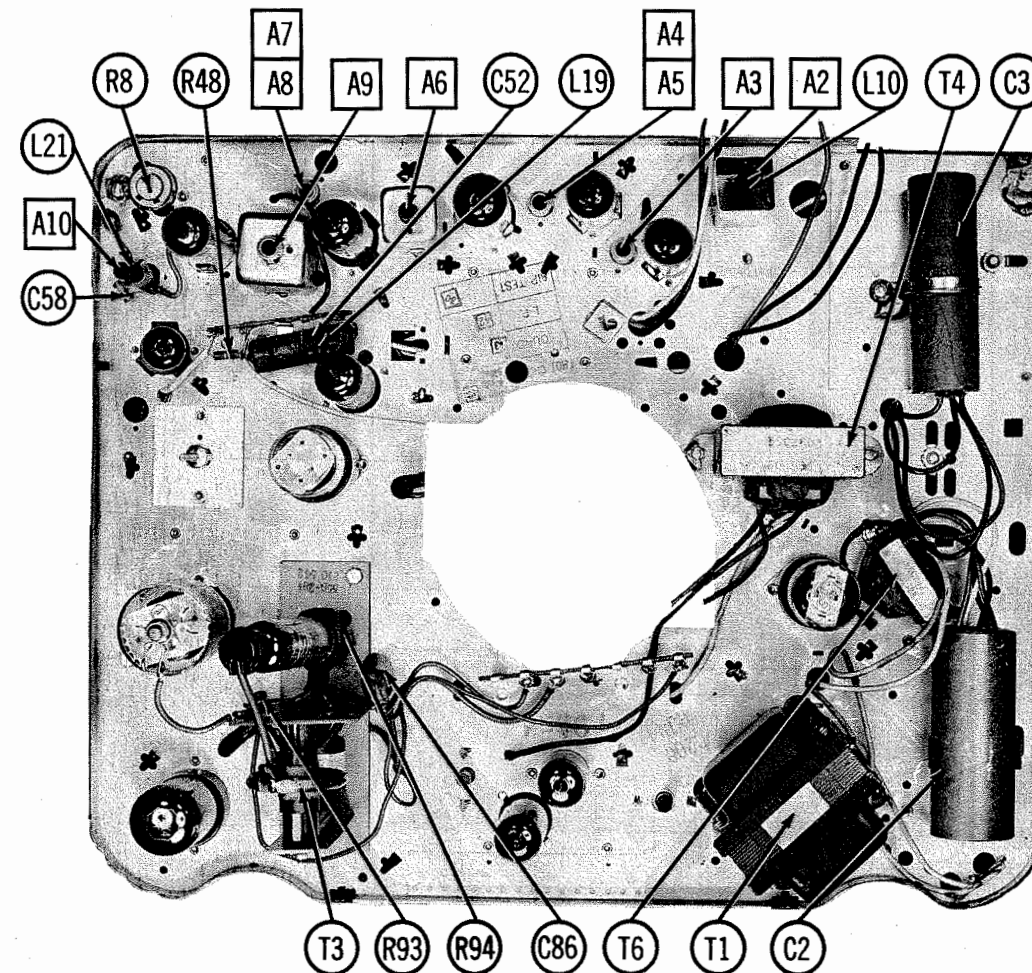
The RF and Mixer portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion of the receiver should not be required in the field.

VHF TUNER ALIGNMENT FOR TUNER #1D2480

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

UHF TUNER ALIGNMENT FOR TUNER #1D2480

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



CHASSIS TOP VIEW

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