

CABINET-REAR VIEW DISASSEMBLY INSTRUCTIONS

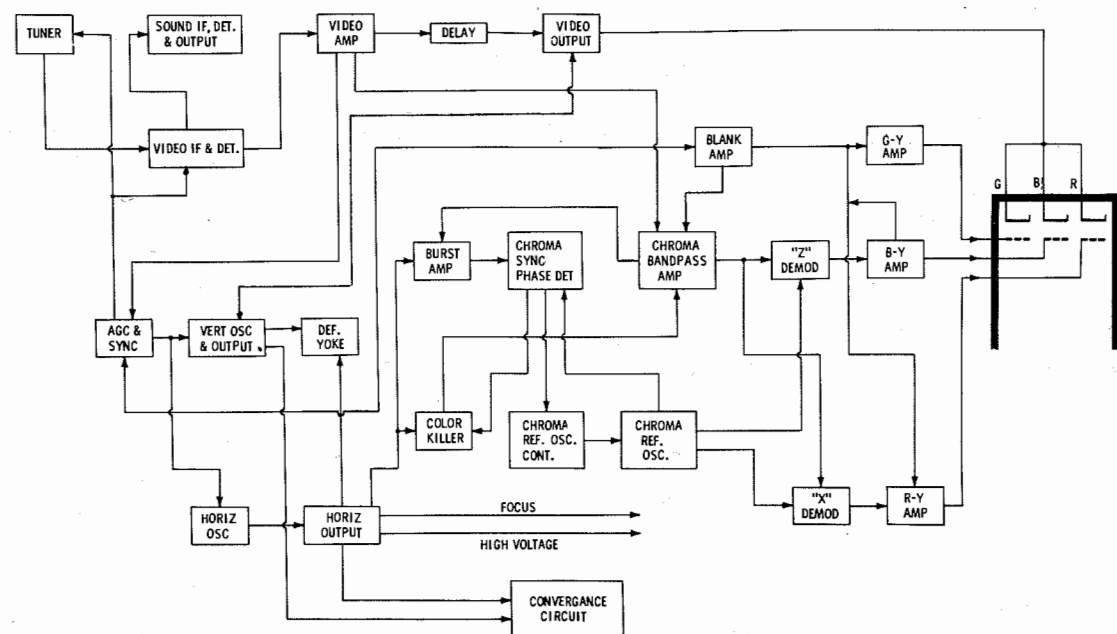
TV CHASSIS REMOVAL - MODEL 21CK1

1. Disconnect antenna leads.
2. Remove 8 wood screws holding rear cover.
3. Remove remote control plugs.
4. Remove 3 knobs at front of cabinet.
5. Remove FM-AM Tuner plug from TV chassis.
6. Remove Power Amp. AC plug from TV chassis.

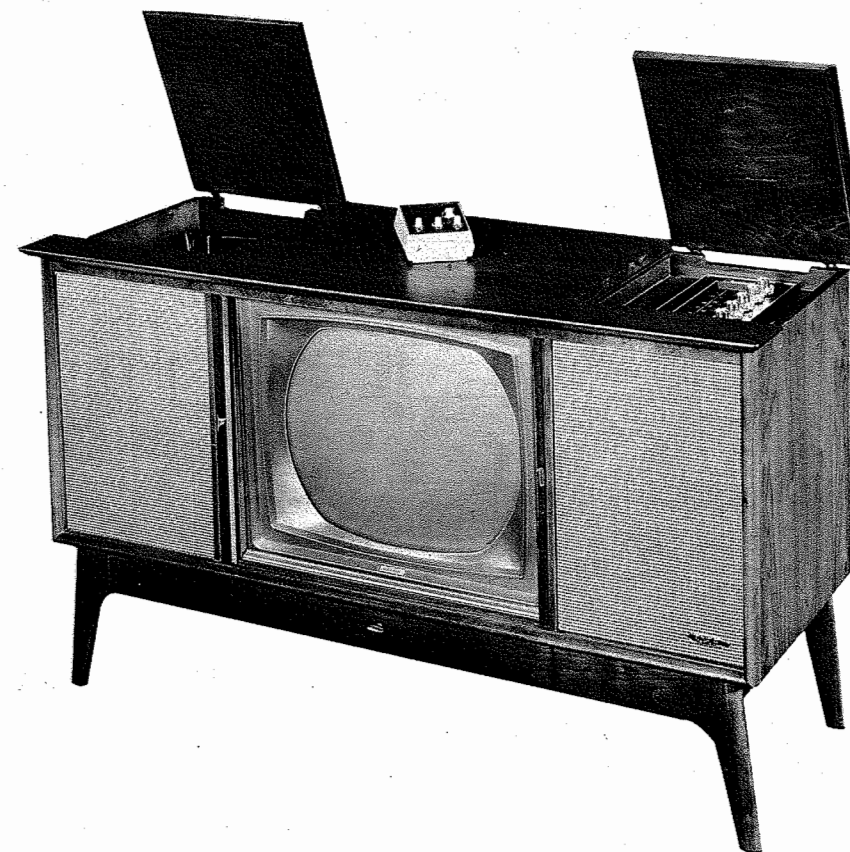
7. Disconnect high voltage lead, picture tube socket, and yoke leads.
8. Remove 4 TV chassis bolts, and 1 screw at left side of TV chassis.
9. Remove 2 screws holding control panel.
10. Pull TV chassis out far enough to disconnect conversion board plug (at TV chassis, left side).

PICTURE TUBE REMOVAL

It is necessary to remove TV chassis for picture tube removal.



BLOCK DIAGRAM



MODEL 21CK1

TRADE NAME	PACKARD-BELL	MODEL	TV Chassis	Remote Control	FM-AM Tuner	Stereo Amp.	VHF Tuner
		21CC3	98C3	RM-301			10651B
		21CC3A	98C3	RM-400			10651B
		21CK1	98C4	RM-401	8TU5	DPA-20	10651B
*Some Versions with Remote Balance Control Chassis RMS-2							
MANUFACTURER	Packard-Bell Electronics Corp., Service Div., 1920 S.O. Figueroa St., Los Angeles 7, Calif.						
TYPE SET	Color Television Receiver						
TUBES	TV: Twenty-Seven FM-AM Tuner: Eight Stereo Amp.: Seven						
POWER SUPPLY	110-120 Volts AC, 60 Cycle						
RATING	460 Watts, 4.4 Amp. @ 117 Volts AC (490 Watts While Tuning)						
	TV: 320 Watts, 3.1 Amp. @ 117 Volts AC (Less Amp.)						
	FM-AM Tuner with Amp.: 140 Watts, 1.3 Amp. @ 117 Volts AC						
	(Selector Switch in FM, AM, or Phono Position, Less Motor)						
TUNING RANGE	TV: Channels 2 thru 13 VHF, Video IF 45.75MC, Sound IF 41.25MC (Inter-carrier)						
	FM-AM Tuner: BC-540 to 1600KC (455KC IF) FM-88 to 108MC (10.7MC IF)						

FOR SERVICE ON RECORD CHANGER (PACKARD-BELL PT. #58093) - SEE SIMILAR GLASER-STEERS MODEL GS-77 REVISED-
PHOTOFACT SET 482 FOLDER 11

SCHEMATICS	PAGE
TV CHASSIS 98C3, 98C4	2
REMOTE CONTROL RM-400, RM-401	10
REMOTE CONTROL RM-301, ALTERNATE CIRCUITS	11
VHF TUNER 10651B	27
FM-AM TUNER 8TU5, REMOTE CONTROL	28, 33
BALANCE CHASSIS RMS-2	28, 33
AMP CHASSIS DPA-20	30

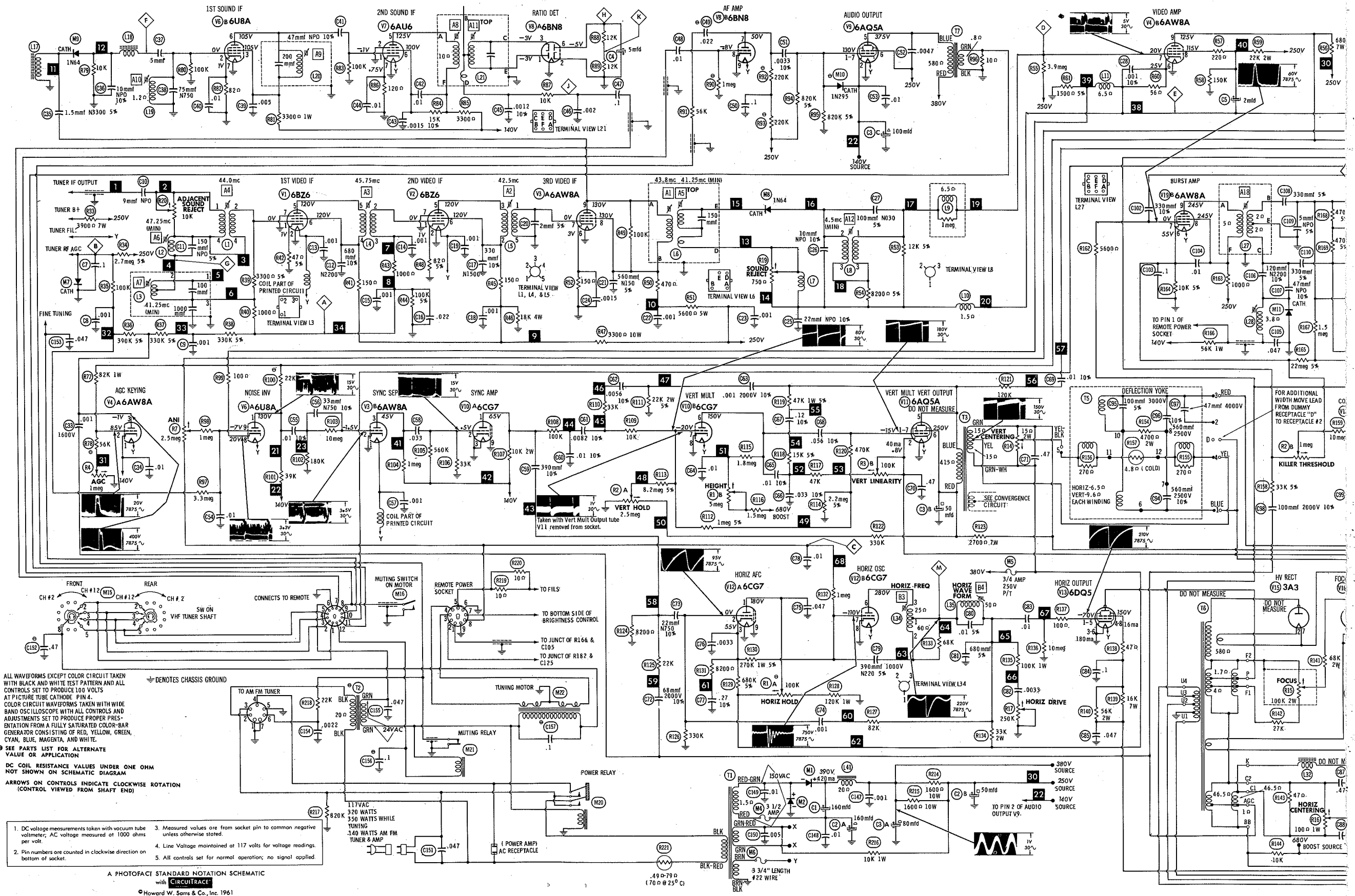
MISCELLANEOUS ADJUSTMENTS - PAGE 17
BLOCK DIAGRAM - BACK PAGE

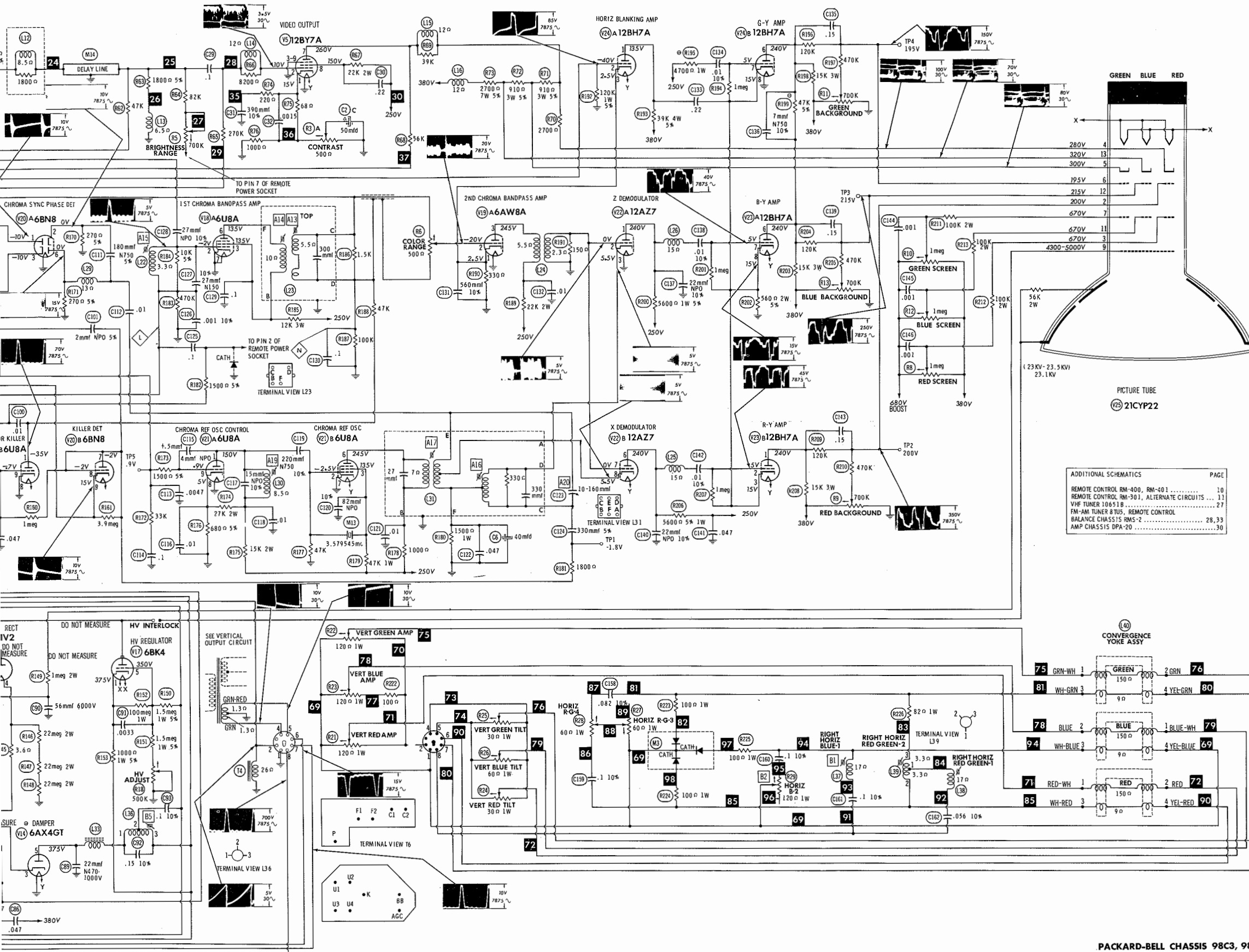
HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana



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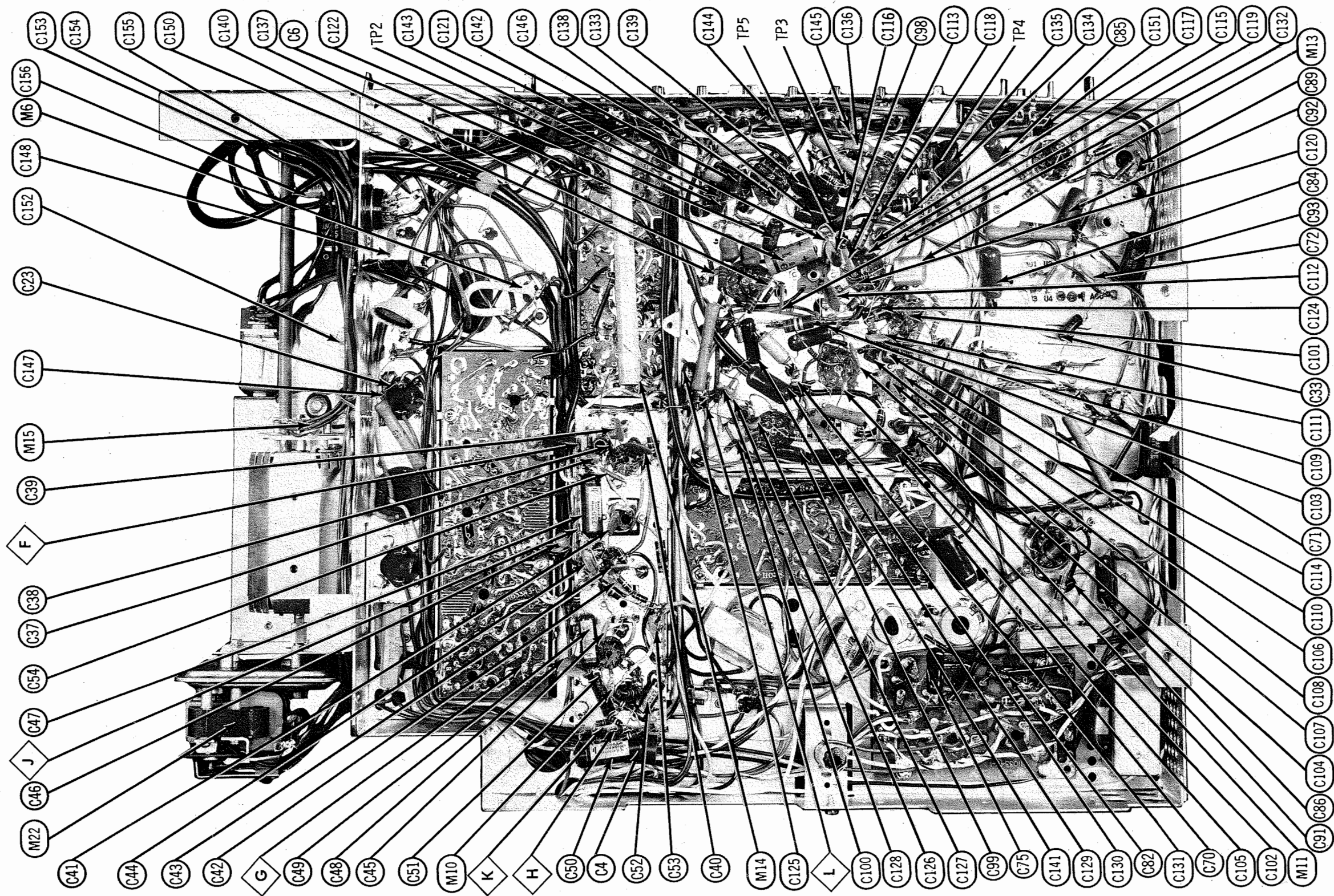
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ADDITIONAL SCHEMATICS	PAGE
REMOTE CONTROL RM-400, RM-401	10
REMOTE CONTROL RM-301, ALTERNATE CIRCUITS	11
VHF TUNER 106518	27
FM-AM TUNER 8TUS, REMOTE CONTROL	28, 33
BALANCE CHASSIS RMS-2	28, 33
AMP CHASSIS DPA-20	30

PACKARD-BELL CHASSIS 98C3, 98C4,
8TUS, DPA-20, RM-301, -400, -401



TV CHASSIS BOTTOM VIEW - ALIGN., CAPACITOR, MISC., TEST POINT IDENT.
 PACKARD-BELL CHASSIS 98C3, 98C4,
 8T05, DPA-20, RM-301, -400, -401

TUBES			
GENERAL ELECTRIC		RAYTHEON	
ITEM No.	USE	ITEM No.	USE
V301	RF Amp.	V302	Mixer - Osc.

FIXED CAPACITORS

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

REPLACEMENT DATA			
ITEM No.	RATING	REMARKS	SPRAGUE PART No.
C301	27 N750 10%		10TCU-Q27
C302	27 N750 10%		10TCU-Q27
C303	27 N750 10%		10TCU-Q27
C304	27 N750 10%		10TCU-Q27
C305	30 N750 10%		10TCU-Q27
C306	28 N750 10%		10TCU-Q27
C307	1000 1.8-7		10TCU-Q27
C308	100 1.8-7		10TCU-Q27
C309	100 1.8-7		10TCU-Q27
C310	100 1.8-7		10TCU-Q27
C311	28 N750 10%		10TCU-Q27
C312	28 N750 10%		10TCU-Q27
C313	28 N750 10%		10TCU-Q27
C314	28 N750 10%		10TCU-Q27
C315	28 N750 10%		10TCU-Q27
C316	28 N750 10%		10TCU-Q27

REPLACEMENT DATA			
ITEM No.	RATING	REMARKS	SPRAGUE PART No.
C317	27 N750 5%		10TCU-Q27
C318	4.7 NPO		10TCU-Q27
C319	3.6 NPO		10TCU-Q27
C320	3 NPO		10TCU-Q27
C321	3 NPO		10TCU-Q27
C322	1000		10TCU-Q27
C323	1000		10TCU-Q27
C324	1000		10TCU-Q27
C325	1000		10TCU-Q27

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

REPLACEMENT DATA			
ITEM No.	RATING	REMARKS	SPRAGUE PART No.
R301	47K		10TCU-Q27
R302	1000K		10TCU-Q27
R303	47K		10TCU-Q27
R304	2700K		10TCU-Q27
R305	220K		10TCU-Q27

PRE-ALIGNMENT INSTRUCTIONS

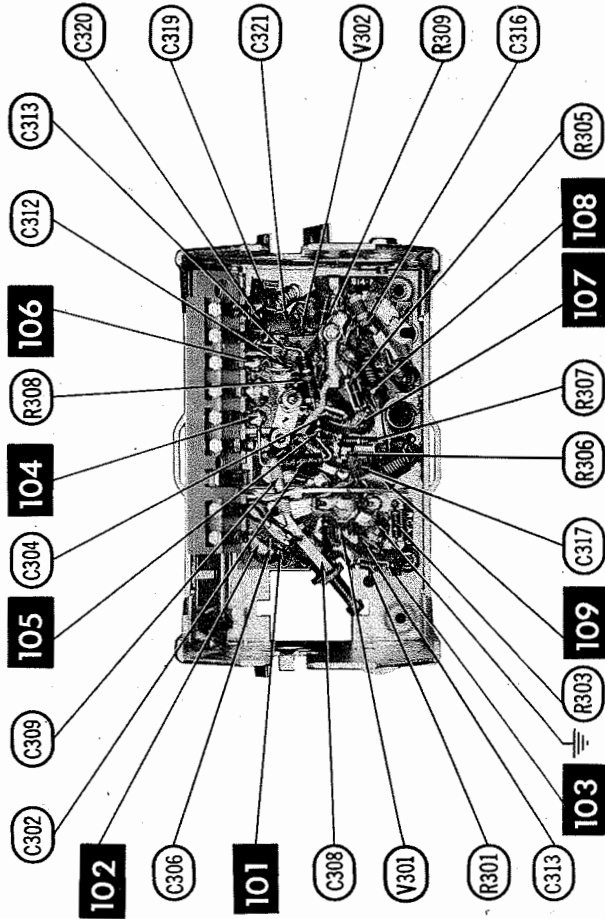
Suggested Alignment Tools: GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8729, 8987, 8988, 8989
WALSCO #2515, 2531, 2532

VHF OSCILLATOR ALIGNMENT

The individual channel adjustment screws are accessible one at a time thru a hole in the rear of the tuner, as the Channel Selector is rotated. Set the Fine Tuning to the center of its range and switch to the channel to be adjusted. Adjust for best picture and sound.

VHF RF AND MIXER ALIGNMENT

This portion of the tuner has been properly aligned at the factory and is very stable. Alignment of this portion should not be attempted in the field.

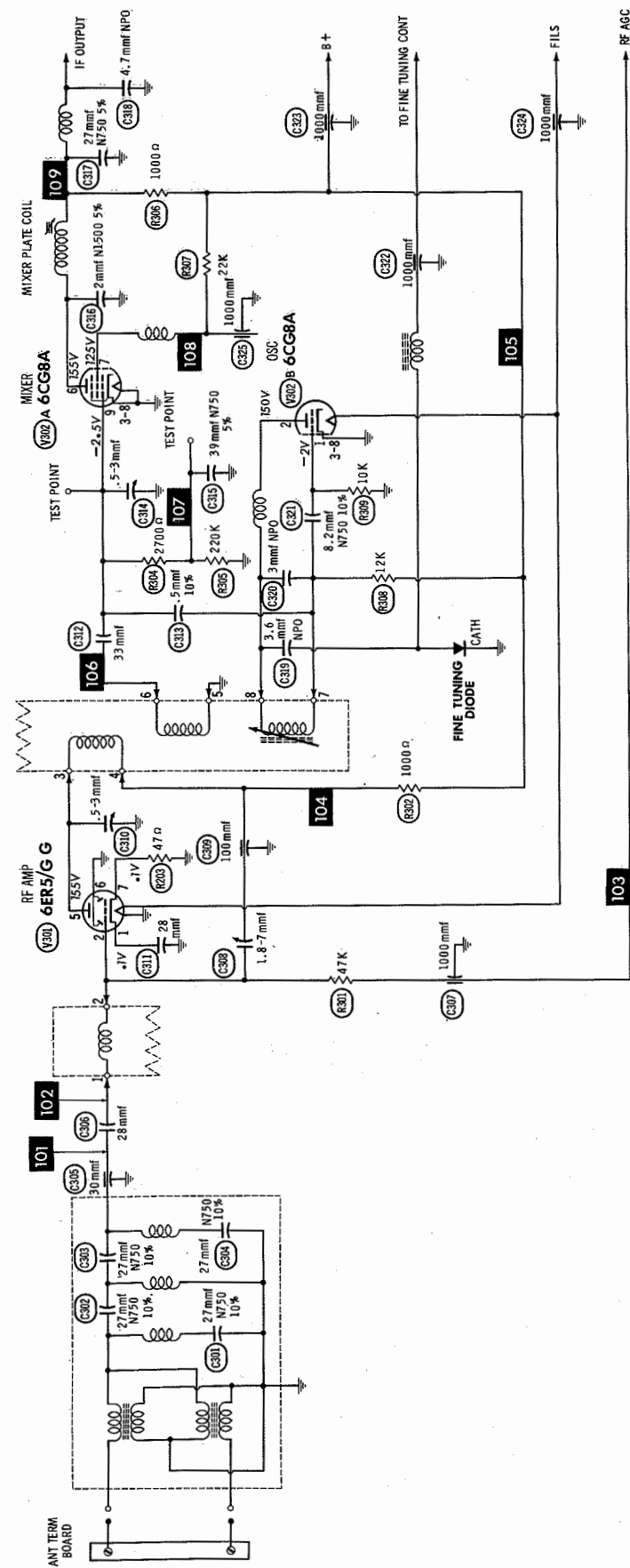


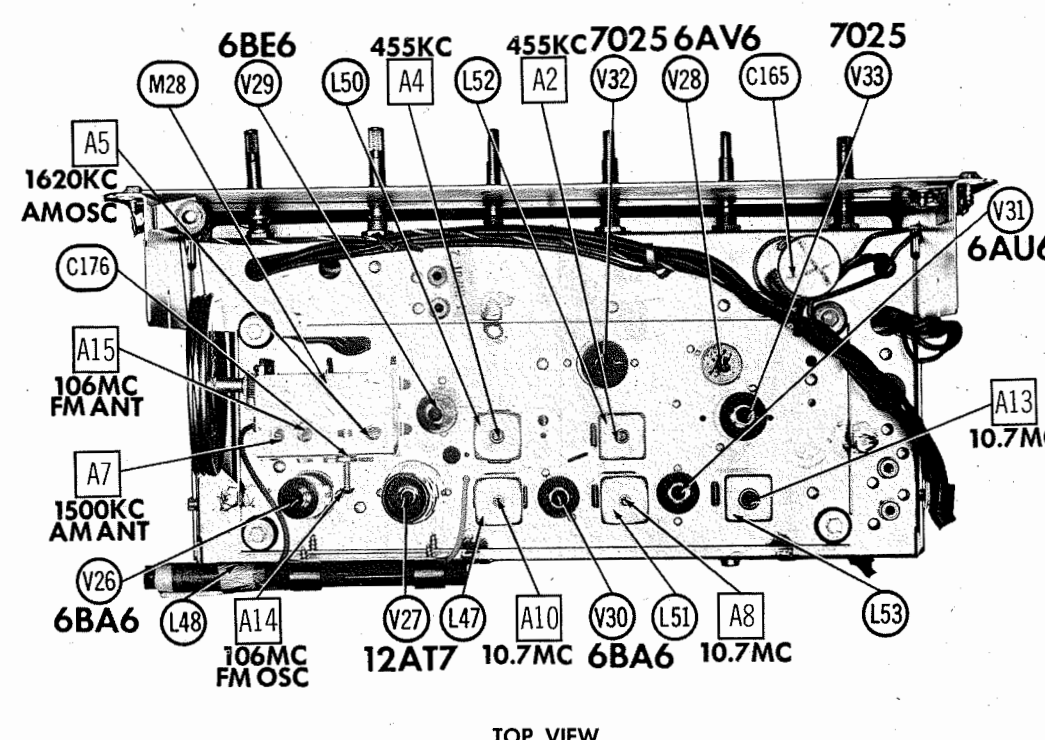
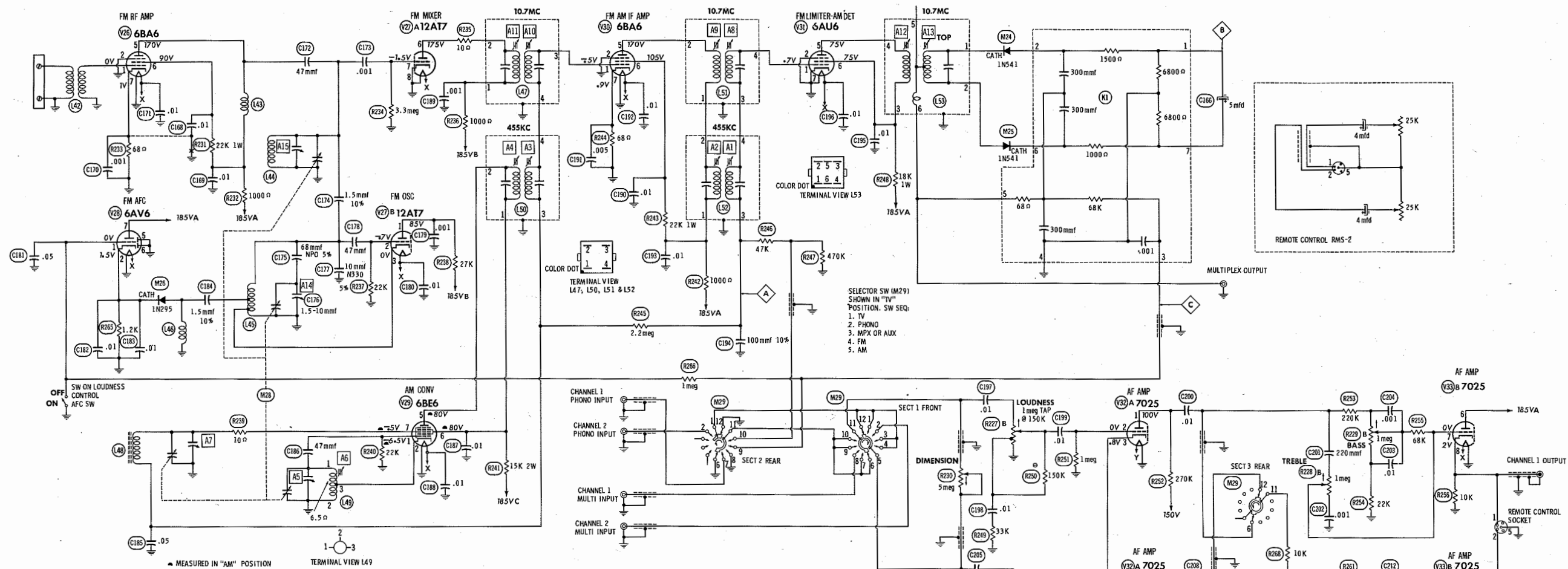
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BOTTOM VIEW

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

TOP VIEW



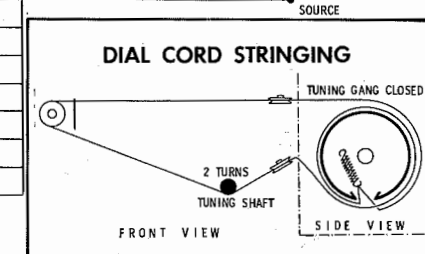


TOP VIEW

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V26	6BA6	.10	0.0	FIL	FIL	14000.0	126K	68.0		
V27	12AT7	130K	22K	.10	FIL	FIL	14000.0	3.3meg	0.0	FIL
V28	6AV6	1.1meg	800.0	FIL	FIL	0.0	0.0	13000.0		
V29	6BE6	22K	.40	FIL	FIL	118K	118K	2.7meg		
V30	6BA6	2.7meg	0.0	FIL	FIL	14000.0	126K	68.0		
V31	6AU6	520K	0.0	FIL	FIL	121K	121K	0.0		
V32	7025	1370K	1meg	1800.0	0.0	16.0	1370K	1meg	1800.0	8.0
V33	7025	13000.0	90K	10K	FIL	FIL	13000.0	90K	10K	FIL

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
 * MEASURED WITH "AFC" OFF.
 † MEASURED FROM PIN 8 OF V40 1AMP RECTIFIER.



DIAL CORD STRINGING

AMP PARTS LIST AND DESCRIPTIONS

TUBES

GENERAL ELECTRIC			RAYTHEON			SYLVANIA		
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V34	Channel 1 AF Amp. - Phase Inverter	12AU7A	V37	Channel 2 AF Amp. - Phase Inverter	12AU7A			
V35	Channel 1 Output	6BQ5 (EL84) *	V38	Channel 2 Output	6BQ5 (EL84) *			
V36	Channel 1 Output	6BQ5 (EL84) *	V39	Channel 2 Output	6BQ5 (EL84) *			
			V40	Rectifier	5U4GB			

* Alternate

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	Packard-Bell PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C213	40	450	24143	PRSI750	BR4045	TC78	TD-40-450	TVA-1712	
C214A	40	450	24147	AFH3-43-50	C0344	FP376.9	TMT-3745	TVL-3786	
C215	250	25	24144	PRSI280	BR2502	TC50025	TD-250-25	TVA-1208	
C216	5	25NP	24126	PRSI7405	BBR4-150	TCN505		TVANS-1303.1*	
C217	5	25NP	24126	PRSI7405	BBR4-150	TCN505		TVANS-1303.1*	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENDO PART No.	MALLORY PART No.	SPRAGUE PART No.
C218	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10
C219	330		DI-330	DD-331	L10T33	CCD-331	B-333	10TS-T33
C220	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C221	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C222	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C223	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C224	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10
C225	330		DI-330	DD-331	L10T33	CCD-331	B-333	10TS-T33
C226	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C227	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C228	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C229	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C230	.02 1400V		P1684CM-02		CUB16S2	16DP-4-203	GEM-1612	MB-S2
C231	.05 600V		P688N-05	DD-503	CUB6S5	6DP-3-503	GEM-615	6TM-S50

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA			ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN TV PART No.	REMARKS			IRC PART No.	WORKMAN TV PART No.	REMARKS
R270	470K				R282	100K			
R271	470K				R283	470K			
R272	1800Ω				R284	470K			
R273	100K				R285	100K			
R274	100K				R286	2700Ω 7W	PW7-2700	7W-SQ-2700	
R275	470K				R287	10Ω			
R276	470K				R288	300Ω 10W 5%			
R277	100K				R289	2500Ω 10W	PW10-2500	10W-SQ-2500	
R278	470K				R290	47K 1W 5%			
R279	470K				R291	100Ω			
R280	1800Ω				R292	100Ω			
R281	100K				R293	100K			

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA				NOTES	
	PRI.	SEC. 1	SEC. 2	Packard-Bell PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.		Triad PART No.
T8	117V ② 1.3A	650VCT ② 180A DC	5A ② 3A	89083B		P-8331 ①		R-42BC	① Drill new mounting hole(s).
	SEC. 3	SEC. 4	SEC. 5						
	6.3V ② 3.7A	6.3V ② 2.4A							

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
			Packard-Bell PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triod PART No.	
	PRI.	SEC.						
T9	7200Ω CT	6-8Ω	89460 ①	A-3021	A-3870	22S58	S-55X	① Alternate Part #89532B.
T10	7200Ω CT	6-8Ω	89460 ①	A-3021	A-3870	22S58	S-55X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Packard-Bell PART No.	QUAM PART No.	
SP2	10"	PM	6-8Ω	83711D ①	10A6PA	① Used in Model 21CK1.
SP3	4"	PM	6-8Ω	83110B ①	4A1S28	② Two used in Models 21CC3, 21CC3A.
SP4	4"	PM	6-8Ω	83111B ①	4A1S28	
SP5	10"	PM	6-8Ω	83711D ①	10A6PA	
SP6	4"	PM	6-8Ω	83110B ①	4A1S28	
SP7	4"	PM	6-8Ω	83111B ①	4A1S28	
	6" x 9"	PM	6-8Ω	83113 ②	69A1Z6	

TV PARTS LIST AND DESCRIPTIONS

TUBES

GENERAL ELECTRIC			RAYTHEON			SYLVANIA		
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	1st Video IF Amp.	6BZ6	V15	HV Rectifier	3A3			
V2	2nd Video IF Amp.	6BZ6	V16	Focus Rectifier	1V2			
V3	3rd Video IF Amp. - Sync Separator	6AW8A	V17	4V Regulator	6BK4			
V4	Video Amp. - AGC Keying	6AW8A	V18	1st Chroma Bandpass Amp. - Color Killer	6U8A			
V5	Video Output	12BY7A	V19	2nd Chroma Bandpass Amp. - Burst Amp.	6AW8A			
V6	1st Sound IF Amp. - Noise Inverter	6U8A	V20	Chroma Sync Phase Det. - Killer Det.	6BN8			
V7	2nd Sound IF Amp.	6AU6	V21	Chroma Ref. Osc. Control-Chroma Ref. Osc.	6U8A			
V8	Radio Detector - AF Amp.	6BN8	V22	X Demodulator - Z Demodulator	12AZ7			
V9	Audio Output	6AQ5A	V23	R-Y Amp. - B-Y Amp.	12BH7A			
V10	Sync Amp. - Vert. Malt.	6CC7	V24	G-Y Amp. - Horiz. Blanking Amp.	12BH7A			
V11	Vert. Malt. - Vert. Output	6AQ5A						
V12	Horiz. AFC - Horiz. Osc.	6CC7						
V13	Horiz. Output	6DQ5						
V14	Damper	6AX4GT (6AU4GTA)*						

* Alternate

PICTURE TUBE

ITEM No.	REPLACEMENT DATA					NOTES
	Packard-Bell PART No.	GENERAL ELECTRIC PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
V25	21CYP22A		21CYP22A			

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	Packard-Bell PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	160	250	24198	AFH1-31-75	XA0315	WPI31.5	TMS-1480	TVL-1540	
C2A	160	250	24196	AFH3-178-60		FP341.6	TMD-2655	TVLS-3711.2*	
C3A	50	450					TD-150-300		
C4A	50	50							
C5A	50	450	24197	AFH3-182-80		FP342.8	TMD-2425	TVLS-3723.7*	
C6A	50	350					TD-80-450		
C7A	100	200							
C8A	5	50	24038	PRSI310	BBR5-50	TC30	TD-5-50	TVA-1303	
C9A	2	350	24127	PRSI705	BR245	TC595	TD-2-450	TVA-1701	
C10A	40	25	24195	PRSI470	BR4015	TC48	TD-40-150	TVA-1413	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENDO PART No.	MALLORY PART No.	SPRAGUE PART No.
C7	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10
C8	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C9	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C10	9 NPO		NPO-SI 10	TCZ-10	C10V9C	CCTO-100	CNO-410	10TCC-Q10
C11	150 NPO 5%		NPO-DI 150	DTZ-150	C10T15C		CNO-315	10TCC-T15
C12	680 N2200 10%	#23886						
C13	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C14	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C15	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C16	.022 200V		P288N-022	DD-203	CUB4S22	4DP-2-223	GEM-4122	2TM-S22
C17	330 N1500 10%	#23686						
C18	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C19	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C20	2 N150 5%	#23688		TCZ-2R2	C10V2C	CCTO-2R2	CNO-522	10TCC-V22
C21	560 N150 5%							
C22	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C23	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C24	.0015		BPD-0015	DD-152	BYA10D15	CCD-152	B-215	5HK-D15
C25	22 NPO 10%		NPO-DI 22	DTZ-22	C10Q22C	CCTO-220	CNO-422	10TCC-Q22
C26	10 NPO 10%		NPO-DI 10	DTZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10
C27	100 N030 5%	#23691						
C28	.001		DI-1000	DD-102	5R5T1	CCD-102	GP210	10TS-D10
C29	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10
C30	.22 200V		P288N-22		CUB2P22	2DP-4-224	GEM-2022	2TM-P22
C31	390		DI-390	DD-390	L10T39	CCD-391	GP339	10TS-T39
C32	.0015		DI-1500	DD-152	5R5D15	CCD-152	GP215	10TS-D15
C33	.001 1600V		P1684CM-001	DD30-102	CUB16D1	16DP-1-102	UAC-210	BL-D10
C34	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C35	1.5 N3300 5%	#23887						
C36	10 NPO 10%		NPO-DI 10	DTZ-10	C10Q1C	CCTO-100	CNO-410	10TS-Q10
C37	5		NPO-SI 5.0	TCZ-4R7	C10V5C	CCTO-050	CNO-547	10TCC-V50
C38	.75 N750		N750-DI 75	DTN-75	C10Q75U	CCTN-750	CN7-475	10TCU-Q75
C39	.005		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C40	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C41	.01 NPO 10%		NPO-DI 47	DTZ-47	C10Q47C	CCTO-470	CNO-447	10TCC-Q47
C42	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C43	.0015 10%		DI-1500	DD-152	5R5D15	CCD-152	GP215	10TS-D15
C44	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C45	.0012 10%		DI-1200	DD-121	5R5D12	CCD-122	GP212	10TS-D12
C46	.022		BPD-002	DD-202	BYA10D2	CCD-202	B-220	5HK-D20
C47	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10
C48	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C49	.022 400V	Note 1	P488N-022	DD-203	CUB4S22	4DP-2-223	GEM-4122	4TM-S22
C50	.1 600V		P688N-1	DF-104	CUB6P1	6DP-4-104	GEM-601	6TM-P10
C51	.0033 600V 10%		V84C8D33-10%		PM6D33	6DP-1-332	GEM-16233	6TM-D33
C52	.0047 600V	Note 2	P688N-0047	D6-472	CUB6D47	6DP-1-472	GEM-6247	6TM-D47
C53	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C54	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C55	.01 400V 10%		V84C4S1-10%		PM4S1	4DP-1-130	GEM-1611	4TM-S10
C56	33 N750 10%		N750-DI 33	DTN-33	C10Q33U	CCTN-330	CN7-433	10TCU-Q33

TV PARTS LIST AND DESCRIPTIONS (Continued)

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCOPART No.	MALLORY PART No.	SPRAGUE PART No.
C57	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C58	.033 600V		P888N-033	DD-303	CUB8S33	6DP-3-333	GEM-6133	6TM-S33
C59	.390 10%		DI-390	DD-391	L10T39	CCD-391	GP339	10TS-T39
C80	.01 400V 10%		V84C4SI-10%		PM4SI	4DP-1-103	GEM-1611	4TM-S10
C81	.0082 400V 10%		V84C8D82-10%		DPMS8D82	8DP-1-822	GEM-16282	8PS-D82
C82	.0056 400V 10%				DPMS8D56	8DP-1-562	GEM-16256	8PS-D56
C83	.001 2000V 10%	#23757						
C84	.01		BPD-01	DD-103	BYA10SI	CCD-103	B-110	5HK-S10
C85	.01 600V 10%		V84C8SI-10%		PM6SI	8DP-4-103	GEM-1611	8TM-S10
C86	.033 400V 10%		V84C4S33-10%		PM6S33	4DP-3-333	GEM-1613	6TM-S33
C87	.12 400V 10%	#23700-176						
C88	.056 600V 10%		P884CM-057		DPMS8S56	8DP-3-563	GEM-1611	8PS-S56
C89	.01 400V 10%		V84C4SI-10%		PM4SI	4DP-1-103	GEM-1611	4TM-S10
C70	.47 200V		P288N-47		CUB2P47	2DP-5-474	GEM-2047	2TM-P47
C71	.47 200V		P288N-47		CUB2P47	2DP-5-474	GEM-2047	2TM-P47
C72	.68 2000V 10%				HVA20Q68	VCM-20-680K	2DY-468	
C73	.22 NT50 10%		NT50-DI 22	DTN-22	C10Q22U	CCTN-220	CNT-422	10TCU-Q22
C74	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C75	.047 600V		P888N-047	DD-503	CUB8S47	8DP-3-473	GEM-6147	8TM-S47
C76	.0033 600V		P888N-0033	D8-332	CUB6D33	6DP-1-332	GEM-6233	6TM-D33
C77	.27 400V 10%	#23700-180						
C78	.01		BPD-01	DD-103	BYA10SI	CCD-103	B-110	5HK-S10
C79	.390 1000V N220 5%	#24522						
C80	.01 600V 5%	#23758						
C81	.680 5%		V84C8SI-5%		5R5T68	CM-19B-680J	MCJ249	MS-368
C82	.0033 600V		1489-00068		CUB6D33	6DP-1-332	GEM-6233	6TM-D33
C83	.01 600V		P888N-0033	D6-332	CUB6SI	6DP-2-103	GEM-611	6TM-S10
C84	.1 600V		P888N-01	D6-103	CUB8P1	8DP-4-104	GEM-601	8TM-P10
C85	.047 600V		P888N-047	DD-503	CUB8S47	8DP-3-473	GEM-6147	8TM-S47
C86	.047 600V		P888N-047	DD-503	CUB8S47	8DP-3-473	GEM-6147	8TM-S47
C87	.47 200V		P288N-47		CUB2P47	2DP-5-474	GEM-2047	2TM-P47
C88	.47 200V		P288N-47		CUB2P47	2DP-5-474	GEM-2047	2TM-P47
C89	.22 1000V N470	#23697						
C90	.56 800V		HVD-80-56	DD60-580	HVA50Q47	6CCD-470	6DY-447	60GA-Q47
C91	.0033 600V		P888N-0033	D6-332	CUB6D33	6DP-1-332	GEM-6233	6TM-D33
C92	.15 200V 10%		V84C2P15-10%		PM2P15	2DP-3-154	GEM-2015	2TM-P15
C93	.1 600V 10%		V84C8P1-10%		PM8P1	8DP-4-104	GEM-1001	8TM-P10
C94	.560 2500V 10%					VCM-35-561K		
C95	.100 3000V 5%							
C96	.560 2500V 10%							
C97	.47 4000V		HVD-80-47	DD60-470	HVA50Q47	6CCD-470	6DY-447	60GA-Q47
C98	.100 2000V 10%					VCM-20-101K	2DY-310	30TCY-T10
C99	.047 200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C100	.01		BPD-01	DD-103	BYA10SI	CCD-103	B-110	5HK-S10
C101	.2 NPO 5%		NPO-DI 2.0	DI-2R2	C10V2C	CCTO-2R2	CNO-522	10TCC-V22
C102	.330 10%		DI-390	DD-331	L10T33	CM-19B-331K	GP333	10TS-T33
C103	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10
C104	.01		BPD-01	DD-103	BYA10SI	CCD-103	B-110	5HK-S10
C105	.047 200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C106	.120 N2200 10%	#24501						
C107	.47 NPO 10%		NPO-DI 47	DTZ-47	C10Q47C	CCTN-470	CNO-447	10TCC-Q47
C108	.330 5%		1489-00033		5R5T33	CM-19B-331J	MCE241	MS-333
C109	.5 NPO 5%		NPO-DI 5.0	DTZ-4R7	C10V5C	CCTO-050	CNO-547	10TCC-V50
C110	.330 5%		1489-00033		5R5T33	CM-19B-331J	MCE241	MS-333
C111	.180 NT50 5%				C10T18U	CNT-318	CNT-318	10TCU-T18
C112	.01		BPD-01	DD-103	BYA10SI	CCD-103	B-110	5HK-S10
C113	.0047		BPD-0047	DD-472	BYA10D47M	CCD-472	B-247	5HK-D47
C114	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10
C115	.4 NPO ±.5mmf		NPO-DI 4.7	DTZ-4R7	C10V4C	CCTO-4R7	CNO-547	10TCC-V39
C116	.01		BPD-01	DD-103	BYA10SI	CCD-103	B-110	5HK-S10
C117	.15 NPO 10%		NPO-DI 15	DTZ-15	C10Q15C	CCTO-150	B-220	10TCC-Q15
C118	.01		BPD-01	DD-103	BYA10SI	CCD-103	B-110	5HK-S10
C119	.220 NT50 10%		N750-DI 220	DTN-220	C10T22U	CCTN-221	CNT-322	10TCU-T22
C120	.82 NPO 10%		NPO-DI 82	DTZ-82	C10Q82C	CCTO-820	CNO-482	10TCC-Q82
C121	.01		BPD-01	DD-103	BYA10SI	CCD-103	B-110	5HK-S10
C122	.047 200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C123	.10-160	#23442						
C124	.330 5%		1489-00033		5R5T33	CM-19B-331J	MCE241	MS-333
C125	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10
C126	.001 10%		DI-1000	DD-102	5R5DI	CCD-102	GP210	10TS-D10
C127	.27 NT50 10%	#24500						
C128	.27 NPO 10%		NPO-DI 25	TCZ-27	C10Q27C	CCTO-270	CNO-427	10TCC-Q27
C129	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P10
C130	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10
C131	.580 10%		DI-580	DD-561	5R5T56	CCD-561	GP356	10TS-T56
C132	.01		BPD-01	DD-103	BYA10SI	CCD-103	B-110	5HK-S10
C133	.22 400V		P488N-22		CUB4P22	4DP-5-224	GEM-4022	4TM-P22
C134	.01 400V 10%		V84C4SI-10%		PM4SI	4DP-1-103	GEM-1611	4TM-S10
C135	.15 400V		P488N-15		CUB4P15	4DP-4-154	GEM-4015	4TM-P15
C136	.7 NT50 10%				C10Q7C	CNT-568	10TCC-V68	
C137	.22 NPO 10%		NPO-DI 22	DTN-22	C10Q22C	CCTO-220	CNO-422	10TCC-Q22
C138	.01 400V 10%		V84C4SI-10%		PM4SI	4DP-1-103	GEM-1611	4TM-S10
C139	.15 400V		P488N-15		CUB4P15	4DP-4-154	GEM-4015	4TM-P15
C140	.22 NPO 10%		NPO-DI 22	DTN-22	C10Q22C	CCTO-220	CNO-422	10TCC-Q22
C141	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C142	.01 400V 10%		V84C4SI-10%		PM8SI	4DP-1-103	GEM-1611	4TM-S10
C143	.15 400V		P488N-15		CUB4P15	4DP-4-154	GEM-4015	4TM-P10
C144	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C145	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C146	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C147	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C148	.01		BPD-01	DD-103	BYA10SI	CCD-103	B-110	5HK-S10
C149	.01		BPD-01	DD-103	BYA10SI	CCD-103	B-110	5HK-S10
C150	.005		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C151	.047 400V		P488N-047	DD-503	CUB4S1	4DP-3-473	GEM-4147	4TM-S47
C152	.47 200V	Note 1	P288N-47		CUB2P47	2DP-5-474	GEM-2047	2TM-P47
C153	.047 200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C154	.002		BPD-002	DD-202	BYA10D2	CCD-202	B-220	5HK-D20
C155	.047 200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C156	.1 200V	Note 1	P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10
C157	.1 200V	Note 1	P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10
C158	.082 200V 10%		V84C2P1-10%		PM2P1	2DP-3-104	GEM-201	2TM-P10
C159	.1 200V 10%		V84C2P1-10%		PM2P1	2DP-3-104	GEM-201	2TM-P10
C160	.1 200V 10%		V84C2P1-10%		PM2P1	2DP-3-104	GEM-201	2TM-P10

FM-AM TUNER PARTS LIST AND DESCRIPTIONS (Continued)
CONTROLS

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					INSTALLATION NOTES
			Packard-Bell PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R227A	1meg 150K Tap		25098A					Loudness, Channel 2
B	1meg 150K Tap							Loudness, Channel 1
C	Switch							Push-Pull AFC Off-On
R228A	1meg		25542	F1-52		† QW-1545	UE4232	Treble, Channel 2
B	1meg			R2-52				Treble, Channel 1
R229A	1meg		25542	F1-52		† QW-1545	UE4232	Bass, Channel 2
B	1meg			R2-52				Bass, Channel 1
R230A	5meg		25996B			B17-141 SK7		Dimension Push-Pull Dimension Off-On
B	Switch							

† "CONCENTRIKIT" Equivalent: K-2 Kit with Base Elements and Shafts: B13-137, P10-110 (Panel)

(Not available as a factory assembled unit.)

B13-137, R1-130 (Rear)

▲ "STA-LOC" Equivalent: FA16A, RU16A, OS1312, IS1937

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA			ITEM No.	RATING	REMARKS	REPLACEMENT DATA		
			IRC PART No.	WORKMAN TV PART No.	REMARKS				IRC PART No.	WORKMAN TV PART No.	REMARKS
R231	22K 1W					R251	1meg				
R232	1000Ω					R252	270K				
R233	68Ω					R253	220K				
R234	3.3meg					R254	22K				
R235	10Ω					R255	68K				
R236	1000Ω					R256	10K				
R237	22K					R257	33K				
R238	27K					R258	150K				
R239	10Ω					R259	1meg				
R240	22K					R260	270K				
R241	15K 2W					R261	220K				
R242	1000Ω					R262	22K				
R243	22K 1W					R263	68K				
R244	68Ω					R264	10K				
R245	2.2meg					R265	1200Ω				
R246	47K					R266	1meg				
R247	470K					R267	1800Ω				
R248	18K 1W					R268	10K				
R249	33K					R269	100K				
R250	150K				Note 1						

Note 1. 220K used in early versions.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	Packard-Bell PART No.	REPLACEMENT DATA
K1	Ratio Detector Network	300mmf, 300mmf, 300mmf, .001mf, 68Ω, 1000Ω, 1500Ω, 6800Ω, 6800Ω, 68K	23627A	Aerovox PA-694 Centralab PC-342 Sprague C-12

REMOTE CONTROL RM-401
PARTS LIST AND DESCRIPTIONS (Continued)

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
				Packard-Bell PART No.	QUAM PART No.	
SPI	2 1/2"	PM	3-4Ω	83136	25A07	

MISCELLANEOUS

ITEM No.	PART NAME	Packard-Bell PART No.	NOTES
M23	Switch	86824A	Selector

FM-AM TUNER PARTS LIST AND DESCRIPTIONS

TUBES

GENERAL ELECTRIC			RAYTHEON			SYLVANIA		
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V26	FM RF Amp.	6BA6	V31	FM Limiter - AM Det.	6AU6			
V27	FM Mixer - FM Osc.	12AT7	V32	Channel 1 AF Amp. -				
V28	FM AFC	6AV6		Channel 2 AF Amp.	7025			
V29	AM Converter	6BE6	V33	Channel 1 Cath. Follower -				
V30	FM-AM IF Amp.	6BA6		Channel 2 Cath. Follower	7025			

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	Packard-Bell PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C165A	30	450	24177	AFH2-52	B0410	FP259	TMD-2630	TVL-2757	
B	10	450							
C166	5	50	24184A	PTT90	NLW5-60	TC30	MLV5-60	TE-1303	
C167	40	10	24151C	PTT44	NLW40-10	TT15X40	MLV40-12	TE-1133	

FIXED CAPACITORS

ITEM No.	RATING	REMARKS	REPLACEMENT DATA						
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENDO PART No.	MALLORY PART No.	SPRAGUE PART No.	
C168	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C169	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C170	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10	
C171	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C172	.47		DI-47	DD-470	LI0Q47	CCD-470	GP447	10TS-Q47	
C173	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10	
C174	1.5	10%	NPO-SI 1.5	TCZ-IR5	C10V15C		CNO-515	10TCC-V15	
C175	58	NPO 5%		DTZ-68	C10Q68C		CNO-498	10TCC-Q68	
C176	1.5-10			828-10					
C177	10	N330 5%							
C178	.47		DI-47	DD-470	LI0Q47	CCD-470	GP447	10TCS-Q10	
C179	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	10TS-Q47	
C180	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-D10	
C181	.05		BPD-05	DD-503	CUB255	4DP-3-503	GP150	5HK-S50	
C182	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C183	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C184	1.5	10%	NPO-SI 1.5	TCZ-IR5	C10V15C		CNO-515	10TCC-V15	
C185	.05		BPD-05	DD-503	CUB255	4DP-3-503	GP150	5HK-S50	
C186	.47		DI-47	DD-470	LI0Q47	CCD-470	GP447	10TS-Q47	
C187	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C188	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C189	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10	
C190	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C191	.005		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50	
C192	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C193	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C194	100	10%	DI-100	DD-101	LI0T1	CCD-101	GP310	10TS-T10	
C195	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C196	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C197	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C198	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C199	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C200	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C201	220		DI-220	DD-221	LI0T22	CCD-221	B-322	10TS-T22	
C202	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10	
C203	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C204	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10	
C205	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C206	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C207	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C208	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C209	220		DI-220	DD-221	LI0T22	CCD-221	B-322	10TS-T22	
C210	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10	
C211	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C212	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10	

Packard-Bell Part Number
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

TV PARTS LIST AND DESCRIPTIONS (Continued)

FIXED CAPACITORS (cont)

ITEM No.	RATING		REMARKS	REPLACEMENT DATA					
				AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENDO PART No.	MALLORY PART No.	SPRAGUE PART No.
C161	.1	200V 10%		V84C2P1-10%		PM2P1	2DP-3-104	GEM-201	2TM-P10
C162	.056	200V 10%		P684CM-057		DPM56S56	6DP-3-563		6PS-S56

Note 1. Not used in Chassis 98C3. Note 2. .01mfd used in early versions.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer. # Packard-Bell Part Number

CONTROLS

ITEM No.	RATING		REMARKS	REPLACEMENT DATA					INSTALLATION NOTES
				Packard-Bell PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	100K			25631 ①					Horiz. Hold
B	5meg								Height
R2A	2.5meg			25608					Vert. Hold
B	1meg								Killer Threshold
R3A	500Ω			25607					Contrast
B	100K								Vert. Linearity
R4A	1meg			25617	TT-69	B47-1meg-S	BL1-137	TA16L	AGC
B	Shaft				Not Req.	Not Req.	TM4	Not Req.	
R5A	700K			25612	TT-66	A47-750K-S	BL1-136	PTA754L	Brightness Range
B	Shaft				Not Req.	FKS-1/4	TM4	Not Req.	
R6A	500Ω			25624	B-4	A47-500-S	Q11-103	U2	Color Range
B	Shaft				Not Req.	FKS-1/4	Not Req.	Not Req.	
R7	2.5meg			25610	TT-83	B47-2.5meg-S	ELC-2	TA255L	ANI
R8A	1meg			25611	TT-69	B47-1meg-S	BL1-137	TA16L	Red Screen
B	Shaft				Not Req.	Not Req.	TM4	Not Req.	
R9A	700K			25612	TT-66	A47-750K-S	BL1-136	PTA754L	Red Background
B	Shaft				Not Req.	FKS-1/4	TM4	Not Req.	
R10A	1meg			25611	TT-69	B47-1meg-S	BL1-137	TA16L	Green Screen
B	Shaft				Not Req.	Not Req.	TM4	Not Req.	
R11A	700K			25612	TT-66	A47-750K-S	BL1-136	PTA754L	Green Background
B	Shaft				Not Req.	FKS-1/4	TM4	Not Req.	
R12A	1meg			25611	TT-69	B47-1meg-S	BL1-137	TA16L	Blue Screen
B	Shaft				Not Req.	Not Req.	TM4	Not Req.	
R13A	700K			25612	TT-66	A47-750K-S	BL1-136	PTA754L	Blue Background
B	Shaft				Not Req.	FKS-1/4	TM4	Not Req.	
R14A	15Ω	2(WW)		25613	WN-150	A58-15	W11-015X *	R15L	Vert. Centering
B	Shaft				Not Req.	FKS-1/4	SK4	Not Req.	
R15	100K	2(WW)		25616				PFL100A	Focus
R16	100Ω	1(WW)		25618				TA254L	Horiz. Centering
R17A	250K			25615	TT-50	B47-250K-S	BL1-130	TM4	Horiz. Drive
B	Shaft				Not Req.	Not Req.	TM4	Not Req.	
R18A	500K			25614	TT-59	B47-500K-S	BL1-133	PTA55L	High Voltage Adjust
B	Shaft				Not Req.	Not Req.	TM4	Not Req.	
R19	750Ω			25606					Sound Reject
R20	10K	1/4		25605					Adjacent Sound Reject
R21	120Ω	1(WW)		25620					Vert. Red Amp.
R22	120Ω	1(WW)		25620					Vert. Green Amp.
R23	120Ω	1(WW)		25620					Vert. Blue Amp.
R24	30Ω	1(WW)		25621					Vert. Red Tilt
R25	30Ω	1(WW)		25621					Vert. Green Tilt
R26	60Ω	1(WW)		25619					Vert. Blue Tilt
R27	80Ω	1(WW)		25619					Horiz. R-G-3
R28	60Ω	1(WW)		25619					Horiz. R-G-4
R29	120Ω	1(WW)		25620					Horiz. B-2

① Model 21CC3 uses 100K Horiz. Hold (Part #25631) and 500Ω Tone - 5 meg Height (Part #25609) * Do not use Tap.

SEE REMOTE CONTROL PARTS LIST RM-401 (PAGE 23) FOR R30, R31, R32.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA			ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN TV PART No.	REMARKS			IRC PART No.	WORKMAN TV PART No.	REMARKS
R33	3900Ω TW	PW7-3900	TW-SQ-3900		R69	39K	PW3-910	3W-SQ-910	
R34	2.7meg 5%								
R35	100K								
R36	390K 5%								
R37	330K 5%								
R38	330K 5%								
R39	3300Ω 5%								
R40	1000Ω								
R41	150Ω								
R42	47Ω 5%								
R43	1000Ω	PW4-18K	4W-SQ-18K		R77	82K 1W	PW3-910	3W-SQ-910	Note 1
R44	100K 5%								
R45	150Ω								
R46	18K 4W								
R47	3300Ω 10W								
R48	82Ω 5%								
R49	100K								
R50	470Ω								
R51	5600Ω 5W								
R52	150Ω								
R53	12K 5%	PW10-3300	10W-SQ-3300		R78	56K	PW7-2700	TW-SQ-2700	
R54	8200Ω 5%								
R55	3.9meg								
R56	6800Ω TW 5%								
R57	220Ω								
R58	150K								
R59	22K 2W								
R60	56Ω								
R61	1500Ω 5%								
R62	47K								
R63	1800Ω 5%	PW5-5600	5W-SQ-5600		R79	10K			
R64	82K								
R65	270K								
R66	8200Ω								
R67	22K 2W								
R68	56K								
		PW7-6800	7G-6800		R80	100K			
					R81	3300Ω 1W			
					R82	82Ω			
					R83	100K			
					R84	15K			
					R85	3300Ω			
					R86	120Ω			
					R87	10K			
					R88	12K			
					R89	12K			
					R90	1meg			
					R91	56K			
					R92	220K			
					R93	220K			
					R94	820K 5%			
					R95	820K 5%			
					R96	10Ω			
					R97	3.3meg			
					R98	1meg			
					R99	100Ω			
					R100	22K			
					R101	39K			
					R102	180K			
					R103	10meg			
					R104	1meg			

TV PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No.	RATING	REPLACEMENT DATA			ITEM No.	RATING	REPLACEMENT DATA			REMARKS
		IRC PART No.	WORKMAN TV PART No.				IRC PART No.	WORKMAN TV PART No.		
R105	580K				R167	1.5meg				† Matched Pair
R106	33K				R168	470K 5% †				
R107	10K 2W				R169	470K 5% †				
R108	100K				R170	270K 5%				
R109	10K				R171	270K 5%				
R110	33K				R172	33K				
R111	22K 2W 5%				R173	1500Ω 5%				
R112	1meg 5%				R174	27K 2W				
R113	8.2meg 5%				R175	15K 2W				
R114	22meg 5%				R176	680Ω 5%				
R115	1.8meg				R177	47K				
R116	1.5meg				R178	1000Ω				
R117	47K				R179	47K 1W				
R118	15K 5%				R180	1500Ω 1W				
R119	47K 1W 5%				R181	1800Ω				
R120	470K				R182	1500Ω 5%				
R121	120K				R183	470K				
R122	330K				R184	10K 5%				
R123	2700Ω 7W	PW7-2700	7W-SQ-2700		R185	12K 3W				
R124	8200Ω				R186	1500Ω				
R125	22K				R187	100K				
R126	330K				R188	47K				
R127	82K				R189	22K 2W				
R128	120K 1W				R190	330Ω				
R129	880K 5%				R191	150Ω				
R130	270K 1W 5%				R192	120K 1W 5%				
R131	8200Ω				R193	39K 4W 5%	PW4-39K	4W-SQ-39K		Note 1
R132	1meg				R194	1meg				
R133	68K				R195	4700Ω 1W				
R134	33K 2W				R196	120K				
R135	100K 1W				R197	470K				
R136	10meg				R198	15K 3W				
R137	100Ω				R199	47K 5%				
R138	47Ω				R200	5000Ω 1W 5%				Note 1
R139	16K 7W	PW7-16K	7G-16K		R201	1meg				
R140	58K 2W				R202	560Ω 2W 5%				
R141	88K 2W				R203	15K 3W	PW3-15K	3W-SQ-15K		
R142	27K				R204	120K				
R143	47Ω				R205	470K				
R144	10K				R206	5600Ω 1W 5%				
R145	3.6Ω				R207	1meg				
R146	22meg 2W				R208	15K 3W	PW3-15K	3W-SQ-15K		
R147	22meg 2W				R209	120K				
R148	22meg 2W				R210	470K				
R149	1meg 2W				R211	100K 2W				
R150	1.5meg 1W 5%				R212	100K 2W				
R151	1.5meg 1W 5%				R213	100K 2W				
R152	1000Ω 1W (Special)				R214	1600Ω 10W	PW10-1600	10W-SQ-1600		
R153	1000Ω 1W 5%				R215	1600Ω 10W	PW10-1600	10W-SQ-1600		
R154	4700Ω 2W				R216	10K 1W				
R155	270Ω				R217	820K				
R156	270Ω				R218	22K				
R157	4.8Ω (Cold)				R219	10Ω				
R158	33K 5%				R220	10Ω				
R159	10meg				R221	.49Ω-70Ω (70Ω @ 25°C)				
R160	1meg				R222	100Ω				
R161	3.9meg				R223	100Ω 1W				
R162	5600Ω				R224	100Ω 1W				
R163	1000Ω				R225	100Ω 1W				
R164	10K 5%				R226	82Ω 1W				
R165	22meg 5%									
R166	58K 1W									

Note 1. May not be used in early versions.
Note 2. Chassis 98C3 uses 4.7meg.
Note 3. Not used in Chassis 98C3.

Note 4. Chassis 98C3 uses 330K.
Note 5. 100K used in early versions.
Packard-Bell Part Number

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		Packard-Bell PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No.	
L1	1st Video IF	29727					
L2	47.25MC Trap	29722					
L3	41.25MC Trap	29723					
L4	2nd Video IF	29728					
L5	3rd Video IF	29729					
L6A	4th Video IF	29730					
B	41.25MC Trap						
L7	RF Choke (12uh)	29725	BC-568	4622	RTC-8523	T986	
L8	4.5MC Trap	29724					
L9	Peaking (62uh)	29650 ①	TV-193 †	6110 †	RTC-8573 †	T302 †	① Wound on 1meg Resistor.
L10	RF Choke (1.8uh)	29726	BC-562	4604	RTC-8518	T980	† Parallel with 1meg Resistor.
L11	Peaking (180uh)	29731	TV-184	6180	RTC-8597	T310	
L12	Peaking (180uh)	29732 ②	TV-184	6180	RTC-8597	T310	② Wound on 1800Ω Resistor.
L13	Peaking (180uh)	29731	TV-184	6180	RTC-8597	T310	▲ Parallel with 1800Ω Resistor.
L14	Peaking (250uh)	29509	TV-185	6181	RTC-8598	T315	
L15	Peaking (250uh)	29509	TV-185	6181	RTC-8598	T315	
L16	Peaking (250uh)	29509	TV-185	6181	RTC-8598	T315	
L17	RF Choke (12uh)	29646	BC-566	4622	RTC-8522	T988	
L18	RF Choke (12uh)	29646	BC-566	4622	RTC-8522	T988	
L19	1st Sound IF	29714 ③	TV-119	1469	RTC-8602	T248	③ Includes C38.
L20	2nd Sound IF	29576A	TV-119	1469	RTC-8602	T249	
L21	Radio Detector	29694	TV-122	1484 RD	RTC-8608	T267	
L22	Chroma Takeoff	29744					
L23	1st Bandpass	29745				T153	
L24	2nd Bandpass	29743					
L25	Peaking (62uh)	29669	TV-205	6146	RTC-8582	T328	
L26	Peaking (62uh)	29669	TV-205	6146	RTC-8582	T328	
L27	Burst Amp.	29746				T151	
L28	Hue Control	29548A					
L29	RF Choke (12uh)	29742	BC-568	4622	RTC-8522	T988	
L30	Reactance Plate	29748				T155	
L31	Chroma Ref. Osc.	29747					
L32	RF Choke (12uh)	29646	BC-568	4622	RTC-8522	T988	
L33	RF Choke (12uh)	29646	BC-568	4622	RTC-8522	T988	

COILS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA							NOTES
		Packard-Bell PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	Workman TV PART No.	
L34	Horiz. Osc.	29741							
L35	Horiz. Waveform	29681							
L36	Horiz. Linearity	29740							
L37	Right Horiz., Blue #1	29734							
L38	Right Horiz., Red-Green #1	29734							
L39	Right Horiz., Red-Green #2	29735							
L40	Conv. Yoke A-Green Coil								
	B-Blue Coil								
	C-Red Coil								

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					NOTES
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000 Hz)	Packard-Bell PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
L41	.420A	20Ω	.85 Hy.	89510				C-40X	

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA					NOTES
	PRI.	SEC. 1	SEC. 2	Packard-Bell PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	117V @ 2.7A	150V @ 1.8A AC	6.3V @ 2A	89506					
	SEC. 3	SEC. 4	SEC. 5						
	6.3V @ 12A								

TRANSFORMER (MOTOR)

ITEM No.	RATING			REPLACEMENT DATA					NOTES
	PRI.	SEC. 1	SEC. 2	Packard-Bell PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	117V @ .6A	24V @ 1.8A		89060B ①					① Alternate Part #89060A

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		Packard-Bell PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T3	Vert. Output	89508					
T4	Vert. Conv. Choke	89509					
T5	Yoke (Horiz. 12MH) (Vert. 35MH)	29737					
T6	Horiz. Output	89507					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	Packard-Bell PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T7	7500Ω	3-4Ω	89466	A-3020	A-3878 ①	26S48	S-9Z	① Drill new mounting hole(s).

POWER RECTIFIERS

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CURRENT (Measured)		Packard-Bell PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	.420A		72058 ①	1N1764 ①	F6 ①	SR500-①	① Silicon Type
M2	.420A		72058 ①	1N1764 ①	F6 ①	SR500 ①	② Selenium Type
M3A			72060 ②				
B							
C							

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			Packard-Bell PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M4	C	3 1/4A 250V	45047		33203.5 (C 3 1/4A 250V)	346007	C 3 1/4	HC 2 1/2 to 3 1/2
M5	3AG	3/4A 250V P/T	45048		318.750 (3AG 3/4A 250V P/T)		GJV 3/4	
M6		3 3/4" length of #22 wire						

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		Packard-Bell PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M7		72062				
M8	1N64	72057		1N64	1N64	RF AGC Diode
M9	1N64	72057		1N64	1N64	Video Detector, Pigtail
M10	1N295	72060 ①		1N295	1N295	Sound Detector, Pigtail
M11		27062				Audio Bias Clamper
						Burst Limiter
						① Not used in Chassis 98C3.

MISCELLANEOUS

ITEM No.	PART NAME	Packard-Bell PART No.	NOTES
M12	Tuner	10651B	
M13	Crystal	72059	3.58MC
M14	Delay Line	29749	
M15	Switch	88077	
M16	Switch		Motor, Channel Selector
M17	Magnet	58006	Muting
M18	Magnet	58007	Lateral Assembly
M19	Magnet		Purity Ring
	Printed Board	10656	Convergence (3 used)
	Printed Board	10658	Video IF
	Printed Board	10659	Vertical
	Printed Board	10681	Sync
M20	Relay	72052A	Convergence
	Relay	72039	Power (Ch. 98C4)
M21	Relay	72064	Power (Ch. 98C3)
	Switch	88712	Muting
M22	Motor	58087	Slide, Photo, Used in Chassis 98C3
			Power Tuning

FM-AM ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use only enough generator output to provide a usable indication.
Loudness control pulled out to defeat AFC Circuit.
Suggested Alignment Tools: A1 thru A4 GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8728, 8987, 8988, 8989
WALSCO #2515, 2531, 2532
A5, A7, A14, A15 .. GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520
A6, A12, A13 GENERAL CEMENT #8282, 8606, 8606L, 9295, 9440
WALSCO #2528, 2543, 2544, 2545
A8 thru A11 GENERAL CEMENT #8721, 8722
WALSCO #2519

AM ALIGNMENT - SELECTOR IN AM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	High side thru .01mfd to pin 7 (grid) of AM Converter. Low side to chassis.	455KC (400v Mod.)	AM Tuning gang fully open	DC probe to point \odot . Common to chassis.	A1, A2, A3, A4	Adjust for maximum deflection.
2.	Loop	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.	"	530KC	Tuning gang fully closed	"	A6	Adjust for maximum deflection. Repeat steps 2 and 3.
4.	"	1500KC	1500KC Signal	"	A7	Adjust for maximum deflection.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM - SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	High side thru .01mfd to pin 7 (grid) of FM Mixer. Low side to chassis.	10.7MC (Unmod.)	FM Point of non-interference	DC probe to point \odot . Common to chassis.	A8, A9, A10, A11	Adjust for maximum deflection.
6.	"	"	"	DC probe to point \odot . Common to chassis.	A12	"
7.	"	"	"	DC probe to point \odot . Common to chassis.	A13	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

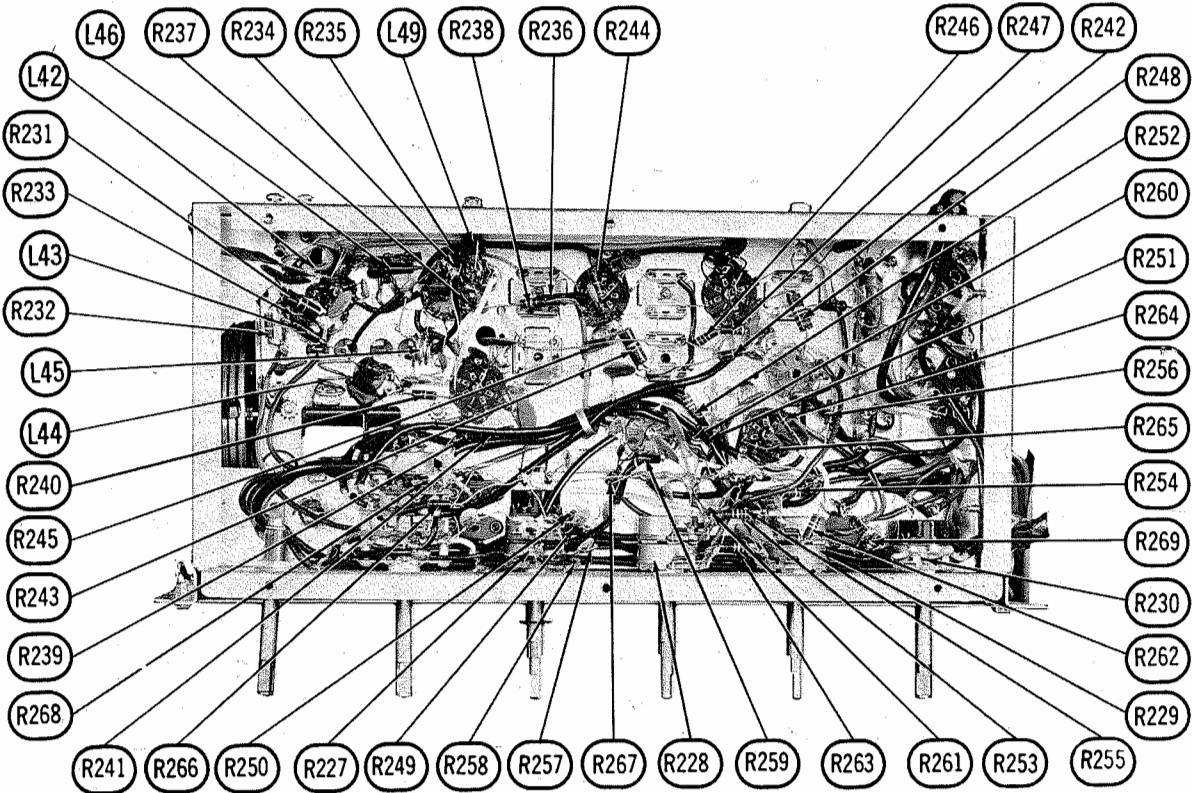
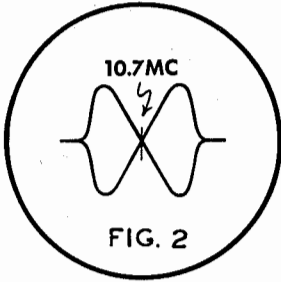
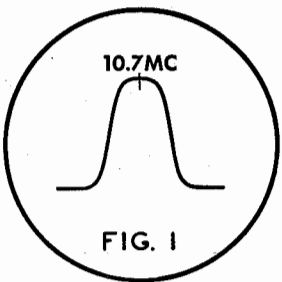
FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE - SELECTOR IN FM POSITION

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

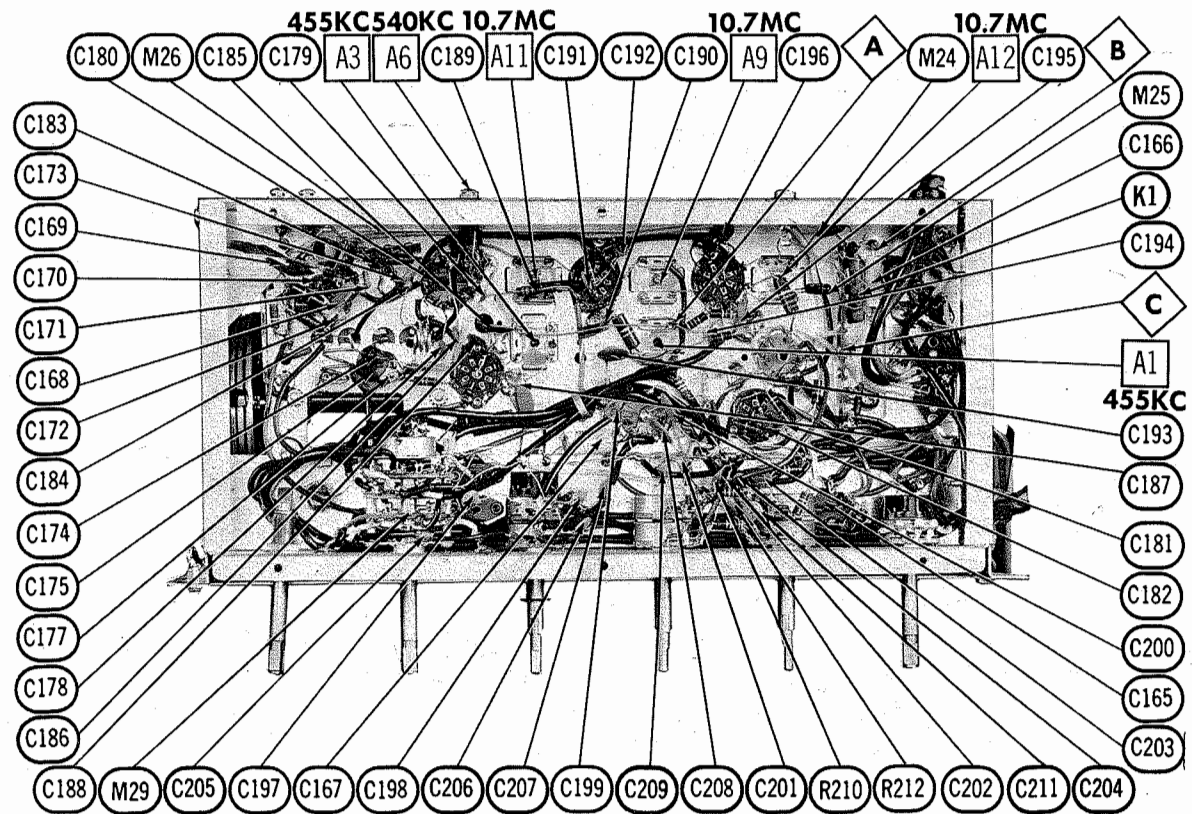
	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5.	High side thru .01mfd to pin 7 (grid) of FM Mixer. Low side to chassis.	10.7MC (450KC Swp.)	FM Point of non-interference	Vert. Amp. to point \odot . Low side to chassis.	A8, A9, A10, A11	Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown.
6.	"	"	"	Vert. Amp. to point \odot . Low side to chassis.	A12	"
7.	"	"	"	Vert. Amp. to point \odot . Low side to chassis.	A13	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A12 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT - SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
8.	Across FM antenna terminals with 150 Ω in each lead.	106MC (Unmod.)	FM 106MC	DC probe to point \odot . Common to chassis.	A14, A15	Adjust for maximum deflection.
9.	"	92MC	92MC	"	L44, L45	Adjust for maximum deflection by expanding or compressing coil turns. Repeat steps 8 and 9.



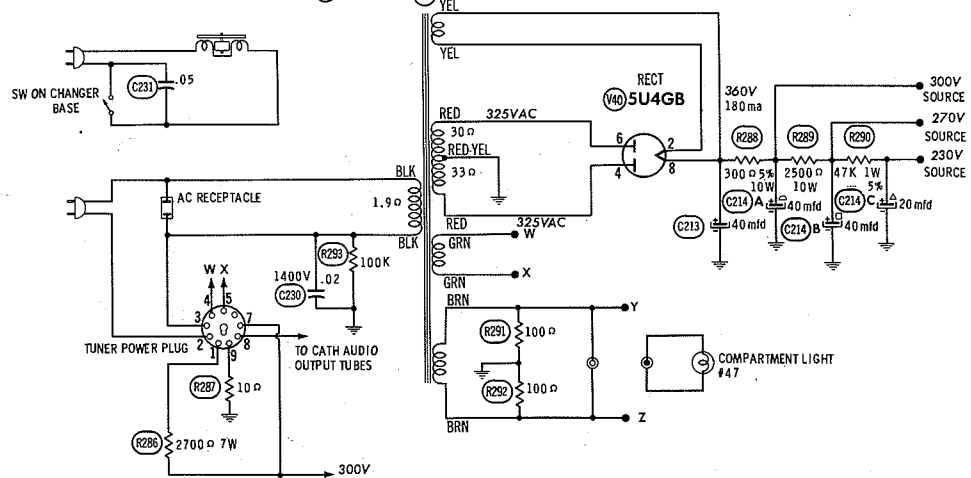
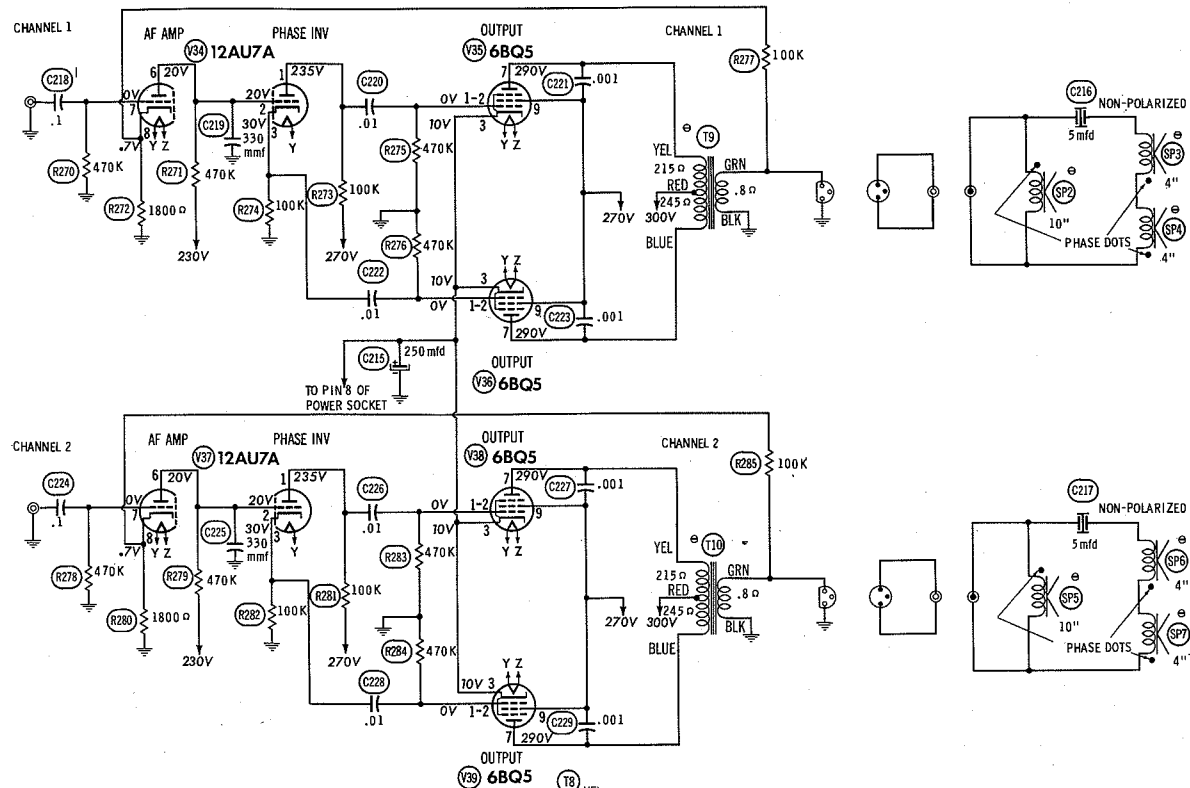
FM-AM TUNER 8TU5 BOTTOM VIEW - RESISTOR, INDUCTOR IDENT.



FM-AM TUNER 8TU5 BOTTOM VIEW - ALIGN., CAPACITOR, MISC. IDENT.

PACKARD-BELL CHASSIS 98C3, 98C4, 8TU5, DPA-20, RM-301, -400, -401

FOLDER 1

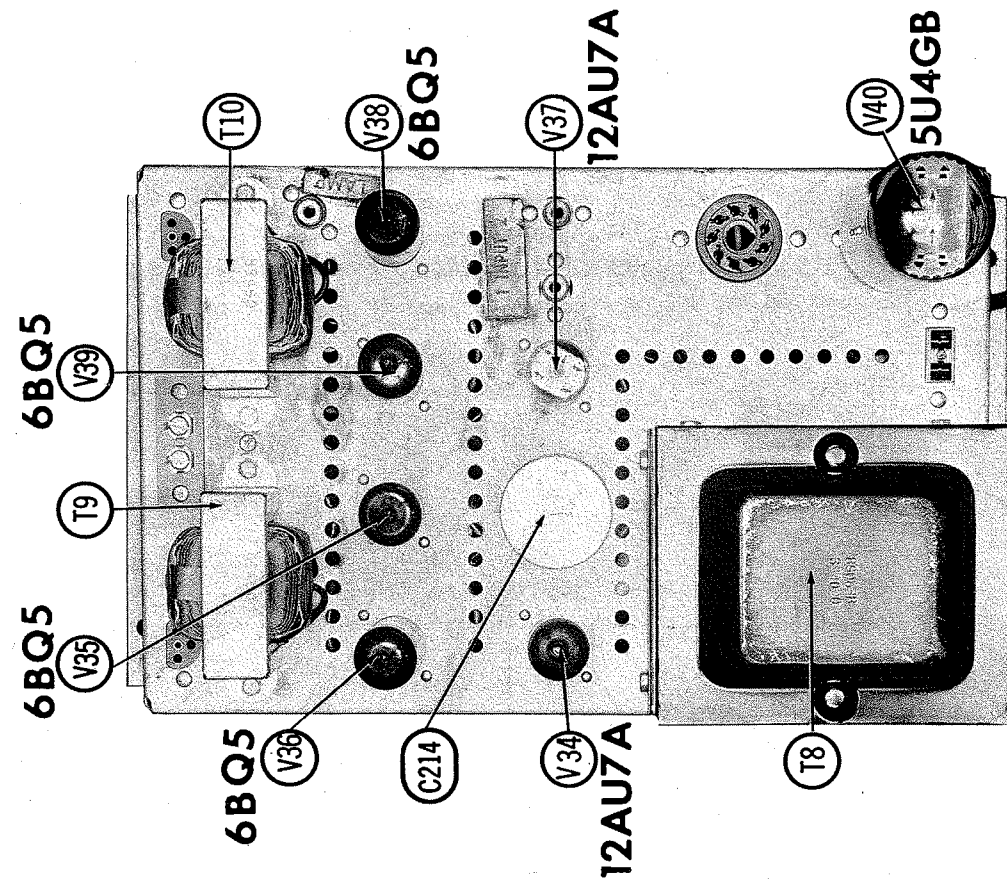


RESISTANCE READINGS

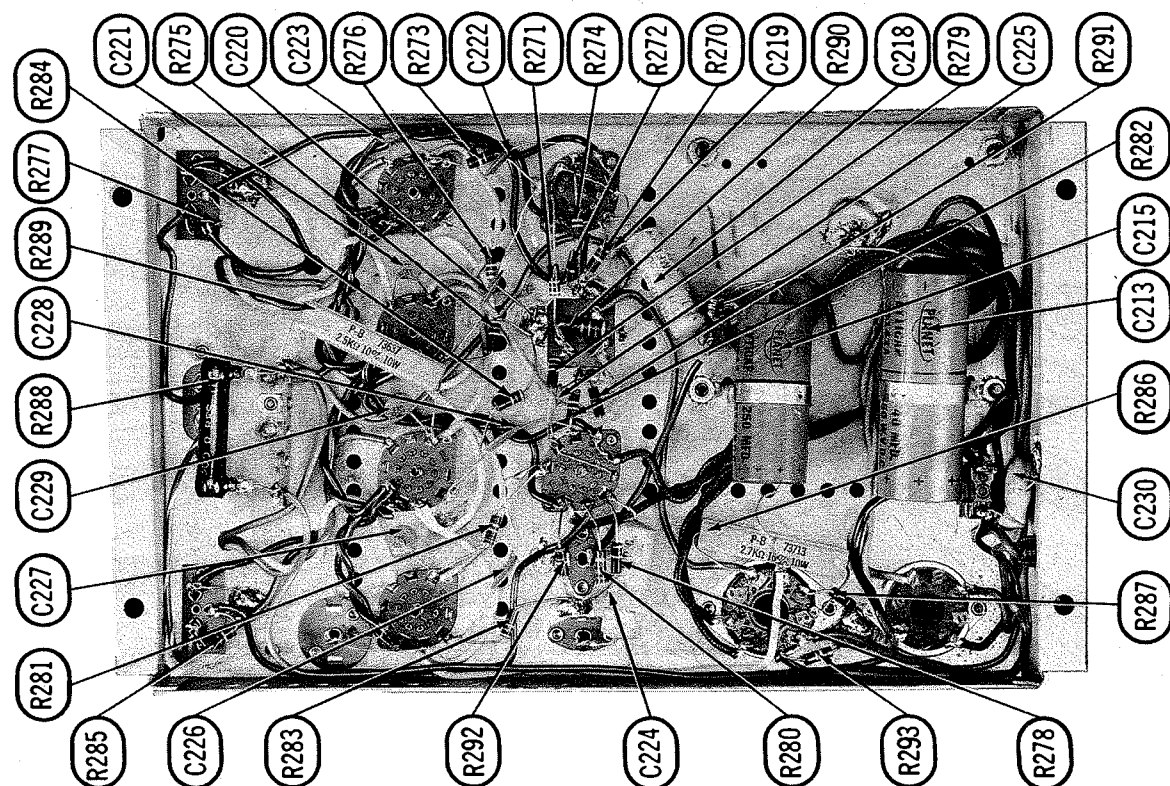
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V34	12AU7A	110K	1520K	100K	FIL	FIL	1520K	470K	1800 ohm	FIL
V35	6BQ5	NC	470K	16 ohm	FIL	FIL	NC	1515 ohm	NC	12800 ohm
V36	6BQ5	NC	470K	16 ohm	FIL	FIL	NC	1545 ohm	NC	12800 ohm
V37	12AU7A	110K	1520K	100K	FIL	FIL	1520K	470K	1800 ohm	FIL
V38	6BQ5	NC	470K	16 ohm	FIL	FIL	NC	1515 ohm	NC	12800 ohm
V39	6BQ5	NC	470K	16 ohm	FIL	FIL	NC	1545 ohm	NC	12800 ohm
V40	5U4GB	NC	1	NC	33 ohm	NC	30 ohm	NC	1	

1 THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
 † MEASURED FROM PIN 8 OF V40. NC NO CONNECTION.

AMP. CHASSIS DPA-20



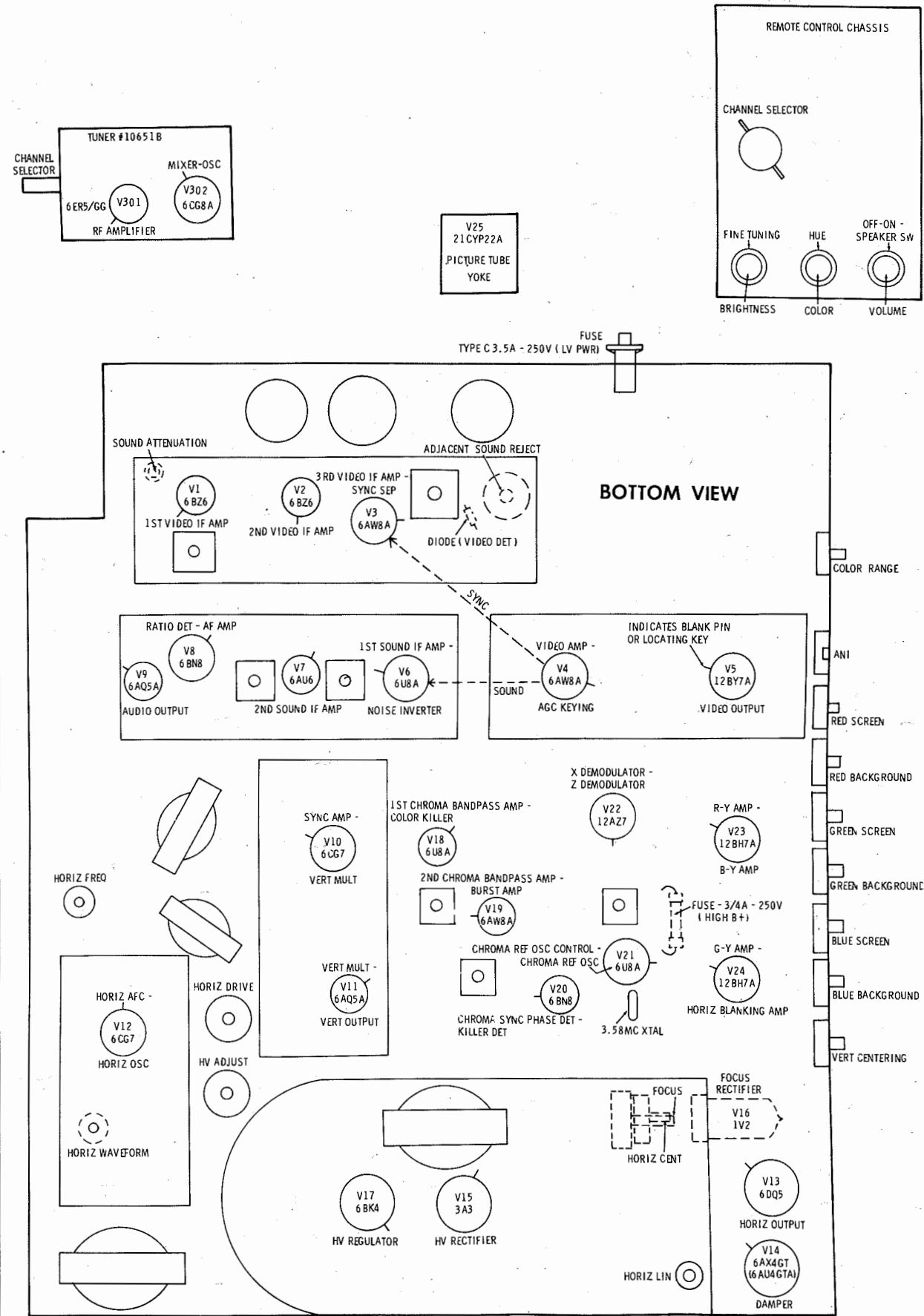
AMP. CHASSIS - TOP VIEW



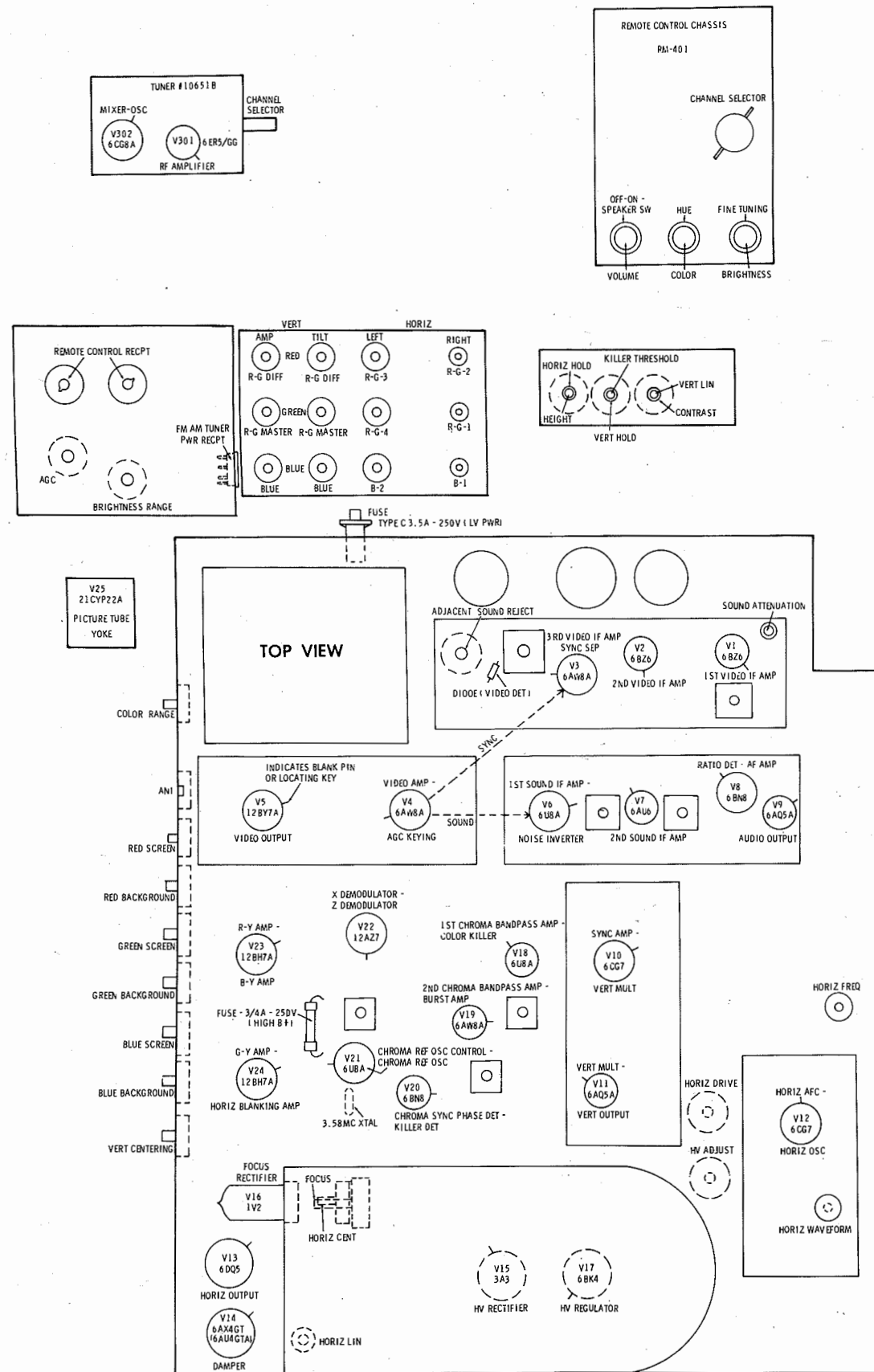
AMP. CHASSIS - BOTTOM VIEW

PACKARD-BELL CHASSIS 98C3, 98C4,
 8TUS, DPA-20, RM-301, -400, -401

TV TUBE PLACEMENT CHART



TV TUBE PLACEMENT CHART



TV ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

The high voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: Al thru A19 GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545
A20 GENERAL CEMENT #5000, 5003, 5014, 5015, 5016, 8276, 8290
WALSCO #2512, 2515, 2522, 2523, 2525, 2537

VIDEO IF ALIGNMENT

Connect the negative lead of a 9 volt bias supply to point ⓐ . Positive to chassis.
Connect the negative lead of a 3 volt bias supply to point ⓑ . Positive to chassis.
Connect the negative lead of a 7 volt bias supply to point ⓒ . Positive to chassis.
Connect negative lead of a 7 volt bias supply to pin 2 of V24. Positive to chassis.
Connect a clip lead from point ⓓ to chassis. Preset Sound Reject (R19) at 75% clockwise rotation. Preset Adjacent Sound Reject (R20) at 50% rotation. Video IF shield must be in place during alignment.

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1. Direct	High side to ungrounded tube shield floating over Mixer-Osc. tube (V302). Low side to chassis.	43.8MC (Unmod.)	4	DC probe thru 10K to point ⓔ . Common to chassis. Use negative scale.	A1	Adjust for maximum deflection. Use peak with core nearest printed board end of coil. Maintain VTVM reading of 1.5 volts by adjusting signal generator output.
2. "	"	42.5MC	"	"	A2	"
3. "	"	45.75MC	"	"	A3	"
4. "	"	44.0MC	"	"	A4	"
5. "	"	"	"	"	Mixer Plate Coil	Adjust for maximum deflection with peak at top end of coil.
6. "	"	41.25MC	"	"	A5, R19	Adjust A5 and Sound Reject (R19) simultaneously for MINIMUM deflection with slug away from chassis. Reduce bias at point ⓕ if necessary for sufficient indication.
7. "	"	47.25MC	"	"	A6, R20	Adjust A6 and Adjacent Sound Reject (R20) simultaneously for MINIMUM deflection with slug away from chassis.
8. "	"	41.25MC	"	DC probe thru 10K to point ⓖ . Common to chassis.	A7	Increase bias at point ⓕ to -6 volts. Adjust A7 for MINIMUM deflection with slug away from chassis.

OVERALL VIDEO IF RESPONSE CHECK

Connect bias as under "Video IF Alignment".
Connect a .001mfd capacitor in series with a 180Ω resistor from pin 5 (plate) of 6BZ6 (V2) to chassis with the resistor next to chassis.
Connect a 1000mmf capacitor across the scope leads.
The Video IF shield must be in place during alignment.
Connect the DC probe of the VTVM to point ⓗ . Common to chassis. (Use negative scale.)
Use 10MC sweep unless otherwise noted.

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9. Direct	High side to ungrounded tube shield floating over Mixer-Osc. tube (V302). Low side to chassis.	45MC	42.17MC 45.75MC	4	Vert. Amp. thru demodulator probe (Fig. 1) to pin 5 (plate) of 6BZ6 (V1). Low side to chassis.		Set sweep output for .1 volt peak to peak on scope. Retouch Mixer Plate Coil and A4 for maximum gain and symmetry of response similar to Fig. 2. Reduce bias to -4 volts at point ⓓ if necessary.
10. "	"	"	41.25MC	"	"		Reduce bias at point ⓕ to zero. Retouch A7 to place marker in trap notch as in Fig. 2.
11. "	"	"	47.25MC	"	"		Retouch A6 and R20 to place marker in trap notch as in Fig. 2. Remove capacitor and resistor load from 6BZ6 (V2). Increase bias at point A to -6 volts. Remove .001 mfd and 180Ω from pin 5 of V2.
12. "	"	"	41.65MC 42.17MC 42.75MC 45.0MC 45.75MC	"	Vert. Amp. thru 10K to point ⓔ . Low side to chassis.		Use 3 volts peak to peak on scope. Retouch A1, A2 and A3 for response similar to Fig. 3 with markers as shown. A1 controls tilt, A2 affects 42.17MC side of curve and A3 affects 45.75MC side. Connect a .001 mfd capacitor from point ⓓ to chassis.
13. "	"	"	41.25MC	"	"		Retouch A5 and R19 to place 41.25MC in trap notch if necessary. Remove .001 mfd.
14. Fig. 4	Across VHF antenna terminals thru matching network (Fig. 4).	All VHF channels separately	42.17MC 45.0MC 45.75MC	All VHF channels separately	"		Decrease bias at point ⓕ to -3 volts. SLIGHTLY retouch A1, A2 and A3 to correct for any overall tilt that is approximately the same on all channels. Repeat step 13.

MISCELLANEOUS ADJUSTMENTS

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Suggested Alignment Tools:
B3, B4 GENERAL CEMENT #8282, 8606, 8606L, 9295, 9440
WALSCO #2546, 2547

Connect a 0 to 500MA meter in series with the cathode circuit of the Horizontal Output tube. Connect a .47mfd capacitor across the meter terminals. Connect a VTVM across the test resistor (R153) in the cathode circuit of the HV Regulator tube. Connect the high side of the scope thru a low capacity probe to point ⓓ . Low side to chassis. Connect the DC probe of a VTVM thru a high voltage probe to high voltage rectifier "cup". Common to chassis. Set Focus control fully counterclockwise. Set Horizontal Hold and Horizontal Drive to the center of their ranges. Set the High Voltage Adjust at two thirds clockwise rotation.

Tune the receiver to a station and synchronize the picture with the Horizontal Hold Range (Freq.) Slug (B3).
Adjust Horizontal Waveform slug (B4) for waveform similar to Fig. 8 with round and sharp peaks of equal amplitudes. Keep the picture in sync during this adjustment with B4.
Adjust the Horizontal Linearity slug (B5) for MINIMUM current indication on the 500MA meter. Then turn B5 one half turn clockwise (toward Max. Inductance).
Adjust the Horizontal Drive control for maximum current without the presence of drive lines in the picture but not to exceed 180MA.
Adjust the High Voltage Adjust for 23KV on the high voltage VTVM. The voltage across R153 should be at least .85 volts (850 microamps).

AGC ADJUSTMENT

Tune in the strongest station in the area. Connect a scope to point ⓖ . Low side to chassis. Adjust the AGC control for 10 volts peak to peak on the scope.

NOISE INVERTER ADJUSTMENT

Connect the vertical amplifier of the scope to point ⓓ . Low side to chassis. Turn the ANI control fully counterclockwise. Turn slowly clockwise while observing the scope. When the tips of the sync appear to be clipped, turn counterclockwise until clipping just disappears.

COLOR AFC ALIGNMENT

Connect the vertical amplifier of the scope to TP-2. Low side to chassis. Connect the DC probe of the VTVM thru a 470K resistor to pin 6 (plate) of Phase Detector (V20). Common to chassis. Set the Hue control to the center of its range. Turn the Killer Threshold control fully counterclockwise. Preset A20 one half turn from tight. Connect a short clip lead from point ⓓ to chassis. Adjust A16 and A17 for maximum deflection on the VTVM. If the Chroma Reference Oscillator is not running, no reading will be obtained. In which case, adjust A19 to start the Oscillator then adjust A16 and A17. Adjust A18 for maximum deflection on the VTVM. Make sure the Oscillator is running and locked in.

Connect a clip lead from TP-5 to chassis. Disconnect the VTVM from the Phase Detector. Adjust A19 until the color bars stand still on the screen or drift slowly. Move the scope connection to TP-2. Low side to chassis. Remove the clip lead from TP-5. Observe the bar pattern on the scope and retouch A18 if necessary, to obtain proper response curve similar to R-Y signal in Fig. 9 with equal change when rotating the Hue control from one end to the other. After this adjustment, return the Hue control to its normal setting. Move the scope connection to TP-3. If necessary, retouch A16 for correct B-Y signal as shown in Fig. 9.

Connect a clip lead from pin 7 (grid) of the Burst Amplifier to chassis. Connect another clip lead from pin 9 (grid) of the Color Killer to chassis. Reconnect the DC probe of the VTVM to pin 7 of the Phase Detector. Adjust A20 for zero volts on the VTVM. A positive and a negative reading will be found on either side of the correct setting. Retouch the setting of A16 by observing the B-Y waveform. Retouch the setting of A20. Check the G-Y waveform by connecting the scope to TP-4 and compare to the G-Y waveform in Fig. 9. Disconnect all clip leads and test equipment. Switch to an unused channel and adjust the Killer Threshold control to the point where color just disappears from the noise pattern on the screen.

PRELIMINARY CONVERGENCE ADJUSTMENTS

Connect the RF output of a white dot generator to the antenna terminals. Preset all Red, Green, and Blue Horizontal and Vertical Convergence controls and coils to the center of their ranges.
Adjust the Red, Green, and Blue Convergence Magnets and the Lateral Magnet to produce a white dot in the center of the screen. Keep the receiver in sharp focus while making this adjustment. Switch the generator to standby position.

COLOR PURITY ADJUSTMENTS

If necessary, demagnetize picture tube and associated components. Set the red tabs of the Purity Magnet together. Set the Edge Purity Magnets so that the two magnets are in the same relative position one above the other.
Loosen the yoke clamp and slide the deflection yoke to the rear as far as possible.
Shunt test points (TP-2 and TP-5) to chassis thru individual 100K resistors. Slide the Purity Magnet around the neck of the picture tube and at the same time spread the red tabs apart to produce a uniform red screen area at the center of the screen.
Move the yoke forward and adjust for best overall red screen without neck shadow. Adjust so that any color impurities occur at the extreme edge of the raster.
Adjust the Screen controls for a white raster and adjust the Edge Purity Magnets for best edge purity. Maximum correction is obtained with the open ends of the magnets 180 degrees apart. Rotate both magnets simultaneously to achieve the desired results.

VERTICAL CONVERGENCE ADJUSTMENTS

Recheck the "Preliminary Convergence Adjustments" for correct settings of the Red, Blue, and Green Magnets and Lateral Magnets to produce a white dot in the center of the raster.
Loosen the two screws holding the convergence board, slide the board to the left and remove. Fasten the board to the two screws provided on the top rail of the cabinet with the controls facing forward so that convergence adjustments may be made from the front of the receiver. Slots are provided in the lower edge of the board for making this mounting. Switch the dot generator to the vertical white bars and adjust the Red and Green Tilt controls for equal displacement of the center bar at the top and bottom. Adjust Red and Green Vertical Amplitude controls until the red and green lines are straight. Gradually reduce the amplitudes to converge the red, green, and blue along the center lines, retouching the Red and Green Tilt controls to keep the lines parallel. The center lines should converge to produce a white vertical line from top to bottom or should show slight displacement of the red at one side, the green at the other with all three lines parallel from top to bottom. Readjust the convergence magnets if necessary to superimpose the three parallel lines to produce a single white line from top to bottom.
Switch the generator to the horizontal bars. Referring to the top and bottom bars as a reference, adjust the Blue Vertical Tilt, and Amplitude controls for equal downward displacement of the blue horizontal from the extreme top and bottom lines at the top center and bottom center of the raster. Reduce the Blue Vertical Amplitude control to converge all lines at the center, retouching the Blue Vertical Tilt SLIGHTLY, if necessary making all white lines at the center from top to bottom.

HORIZONTAL CONVERGENCE ADJUSTMENTS

Switch the generator to crosshatch pattern. If necessary, retouch convergence magnets to produce good convergence at the center of the screen.

Adjust coil B-1 so that the blue horizontal line at the right center of the raster is a straight line.
Adjust control B-2 for a straight blue line to the left side of the raster. Adjust R-G-1 to make the vertical lines at the right side of the raster converge. Adjust R-G-2 to make the horizontal red and green lines at the right side of the screen converge. Readjust B-1 to make the blue line at the right center fall on red and green converged lines. Retouch R-G-1 for convergence of vertical lines at the right side.
Adjust control R-G-3 to make vertical lines at the left side converge. Adjust control R-G-4 to make the red and green horizontal lines at the left side of the screen converge.
The picture or pattern should now show proper convergence over the entire screen.

GRAY SCALE ADJUSTMENT

Set the Screen controls fully clockwise and the Background controls fully counterclockwise. Turn the Brightness and Contrast controls fully counterclockwise after tuning in a station signal. Use a program which displays the full range of contrast from low lights to high lights. Advance the Brightness control to obtain a picture just SLIGHTLY below normal brightness level, the control will usually fall at approximately two-thirds from fully counterclockwise. Be careful not to advance the Brightness to close to overload. If the picture appears to be too dim at the above setting, advance the Contrast control SLIGHTLY. Adjust Red, Blue, and Green Background controls to produce white in the high light areas of the picture.
One screen control will be left at fully clockwise rotation. Which one will be determined as follows:

1. Yellow in lowlight areas. Blue Screen should remain at maximum.
2. Cyan in lowlight areas. Red screen should remain at maximum.
3. Magenta in lowlight areas. Green Screen should remain at maximum.
4. Red, green or blue in lowlight areas. This condition indicates that the Screen control of the color appearing is too high and must be reduced from maximum. Turn this Screen control down slowly. One of the following conditions will occur:
 - a. If the picture becomes gray the two remaining Screens should remain at maximum setting and the Background control for the Screen turned down should be adjusted (with the Brightness control set for normal brightness) to produce white in the highlight areas. The raster should stay white (track) at all brightness levels. Recheck at low level and if necessary, retouch SLIGHTLY the screen control that was previously turned down to achieve gray in the lowlight areas. No further adjustments are required and the balance of this procedure does not apply.
 - b. Yellow in the lowlight areas. Blue Screen should remain at maximum.
 - c. Cyan in lowlight areas. Red Screen should remain at maximum.
 - d. Magenta in lowlight areas. Green Screen should remain at maximum.

From this point on do not adjust either the Screen or Background control for the color which remains at maximum position. THIS IS IMPORTANT.
Turn the Brightness to a low level and adjust the two remaining Screen controls to produce a gray picture in the lowlight areas. Advance the Brightness to normal brightness level and adjust the two remaining Background controls for white in the highlight areas. Check for proper gray scale at all brightness levels. It may be necessary to retouch SLIGHTLY the two Screen controls at lowlight and the Background controls at highlight, remembering not to adjust either the Screen or Background controls for the color set at maximum.

PACKARD-BELL CHASSIS 98C3, 98C4,
8TUS, DPA-20, RM-301, -400, -401

FOLDER 1

TV RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BZ6	100K	47Ω	FIL	FIL	†4000Ω	†4000Ω	0Ω		
V2	6BZ6	100K	82Ω	FIL	FIL	†4000Ω	†4000Ω	0Ω		
V3	6AW8A	0Ω	10meg	■1meg	FIL	FIL	150Ω	.1Ω	†6800Ω	†6800Ω
V4	6AW8A	■0Ω	●60K	400K	FIL	FIL	900Ω	6000Ω	†23K	†7000Ω
V5	12BY7A	●400Ω	●350K	NC	FIL	FIL	FIL	†4600Ω	†23K	0Ω
V6	6U8A	†25K	.1Ω	■3300Ω	FIL	FIL	■3300Ω	82Ω	1000Ω	●1meg
V7	6AU6	100K	0Ω	FIL	FIL	■3300Ω	■18K	120Ω		
V8	6BN8	INF	0Ω	INF	FIL	FIL	24K	†440K	1meg	0Ω
V9	6AQ5A	200K	†30K	FIL	FIL	†600Ω	†820Ω	200K		
V10	6CG7	■10K	30K	0Ω	FIL	FIL	●†5meg	2.3meg	0Ω	0Ω
V11	6AQ5A	NC	20Ω	FIL	FIL	†3100Ω	†2700Ω	2.4meg		
V12	6CG7	●†65K	330K	†500K	FIL	FIL	†33K	550K	0Ω	0Ω
V13	6DQ5	10meg	FIL	0Ω	†12K	10meg	0Ω	FIL	†12K	TOP CAP †15Ω
V14	6AX4GT	NC	NC	350K	NC	†32Ω	NC	FIL	FIL	
V15	3A3	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP †600Ω
V16	1V2	NC	NC	NC	66meg	66meg	TP	NC	NC	†100K
V17	6BK4	†1000Ω	FIL	NC	NC	●1meg	NC	FIL	NC	TOP CAP INF
V18	6U8A	150K	470K	†13K	FIL	FIL	†13K	0Ω	0Ω	4.5meg
V19	6AW8A	330Ω	100K	†23K	FIL	FIL	10K	5600Ω	†1800Ω	†1800Ω
V20	6BN8	2meg	270Ω	2.8meg	FIL	FIL	270Ω	4.2meg	4.2meg	2.8meg
V21	6U8A	†12K	47K	†48K	FIL	FIL	†1800Ω	0Ω	680Ω	2.4meg
V22	12AZ7	†6400Ω	1Ω	1500Ω	FIL	FIL	†6400Ω	1Ω	1500Ω	FIL
V23	12BH7A	†15K	1meg	560Ω	FIL	FIL	†12K	1meg	560Ω	FIL
V24	12BH7A	†39K	120K	330Ω	FIL	FIL	†12K	1meg	560Ω	FIL
V25	21CYP22A	FIL	†130K	●†160K	†7200Ω	†3600Ω	†120K	●†160K	Pin 9 67meg	Pin 11 ●†160K
		Pin 12 115K	Pin 13 †2700Ω	Pin 14 FIL						
V301	6ER5/GG	47Ω	400K	FIL	FIL	†5700Ω	0Ω	47Ω		
V302	6CG8A	10K	†17K	0Ω	FIL	FIL	†5700Ω	†27K	0Ω	220K

† THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
 ● THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
 † MEASURED FROM OUTPUT OF M1. ■ MEASURED FROM PIN 2 OF V9.
 † MEASURED FROM PIN 3 OF V14. NC NO CONNECTION TP TIE POINT

TV ALIGNMENT INSTRUCTIONS

SOUND IF ALIGNMENT

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
15. .01mfd	High side to pin 7 (grid) of 3rd Video IF Amp. Low side to chassis.	4.5MC (Unmod.)	Any non-interfering channel	DC probe to point Ⓢ. Common to chassis.	A8, A9, A10	Adjust for maximum deflection.
16. "	"	"	"	DC probe to point Ⓢ. Common to point Ⓢ.	All	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

4.5MC TRAP ALIGNMENT

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
17. .01mfd	High side to pin 7 (grid) of 3rd Video IF Amp. Low side to chassis.	4.5MC (400v 30% AM)	Any non-interfering channel	DC probe thru detector probe to pin 6 (plate) of 1st Chroma Bandpass Amp. Common to chassis.	A12	Adjust for MINIMUM deflection.

CHROMA BANDPASS ALIGNMENT

Connect the negative lead of a 7 volt bias supply to point ①. Positive to chassis. Connect a clip lead from point ② to chassis. Turn Color Range fully clockwise.							
DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
.1mfd	High side to pin 2 (grid) of 6U8 (V18). Low side to chassis.	3.58MC (3.5MC Sweep)	3.08MC 4.08MC	Any non-interfering channel	Vert. Amp. thru demodulator probe (Fig. 5) to pin 2 (grid) of 12AZ7 (V22). Low side to chassis.	A13, A14	Adjust for response similar to Fig. 6 with equal marker height.
Turn the Brightness Range, Contrast, and A. N. I. controls fully counterclockwise. Connect 330Ω resistor and 4mfd capacitor in series from plate (pin 6) of 6U8 (V18) to chassis.							
Direct	High side to ungrounded tube shield floating over Mixer-Osc. Tube (V302). Low side to chassis. Connect high side of separate marker generator to ungrounded tube shield of 1st Chroma Bandpass Amp. (V18). Low side to chassis.	45MC (10MC Sweep)	3.08MC 4.08MC	Any non-interfering channel	Vert. Amp. thru demodulator probe (Fig. 6) to pin 2 (grid) of 12AZ7 (V22). Low side to chassis.	A15	Remove clip lead between point ② and chassis. Adjust A15 for response similar to Fig. 7. Peak with core nearest chassis end of coil form.

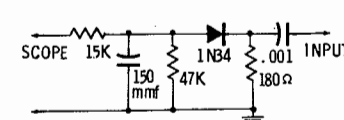


FIG. 1

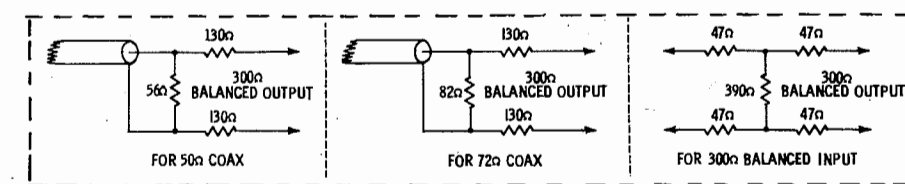


FIG. 4

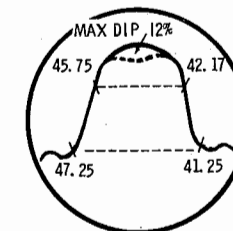


FIG. 2

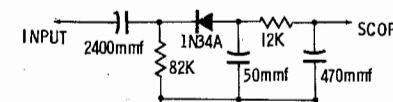


FIG. 5

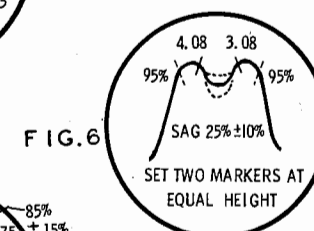


FIG. 6

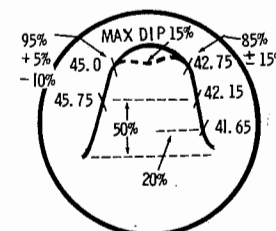


FIG. 3

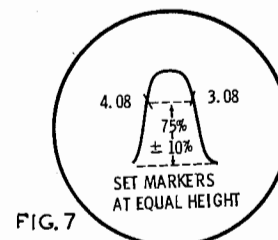


FIG. 7

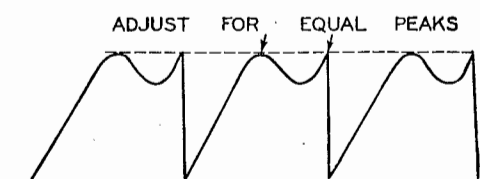


FIG. 8

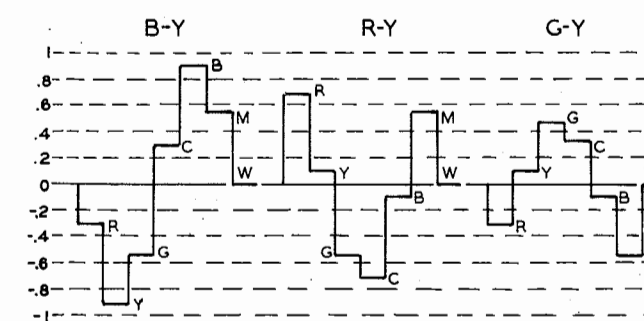
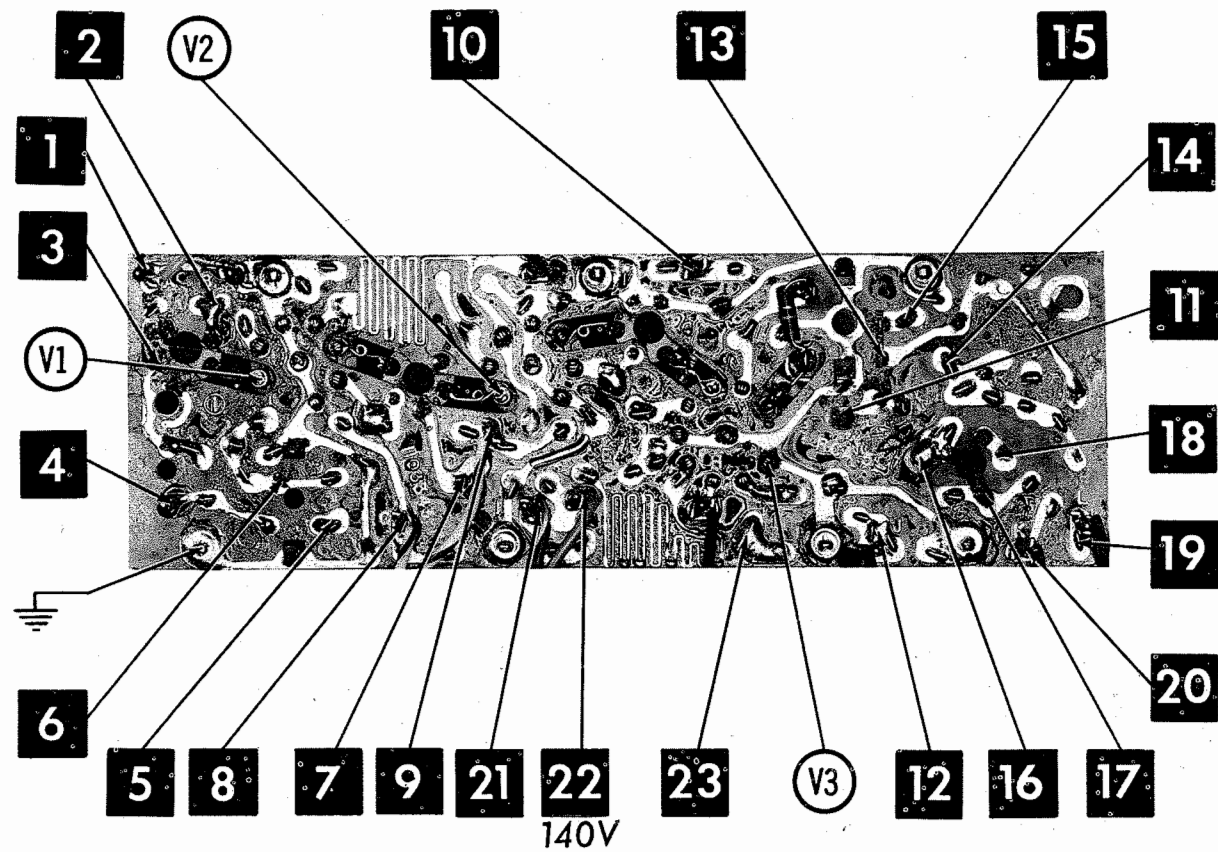


FIG. 9

PACKARD-BELL CHASSIS 98C3, 98C4, 8TU5, DPA-20, RM-301, -400, -401

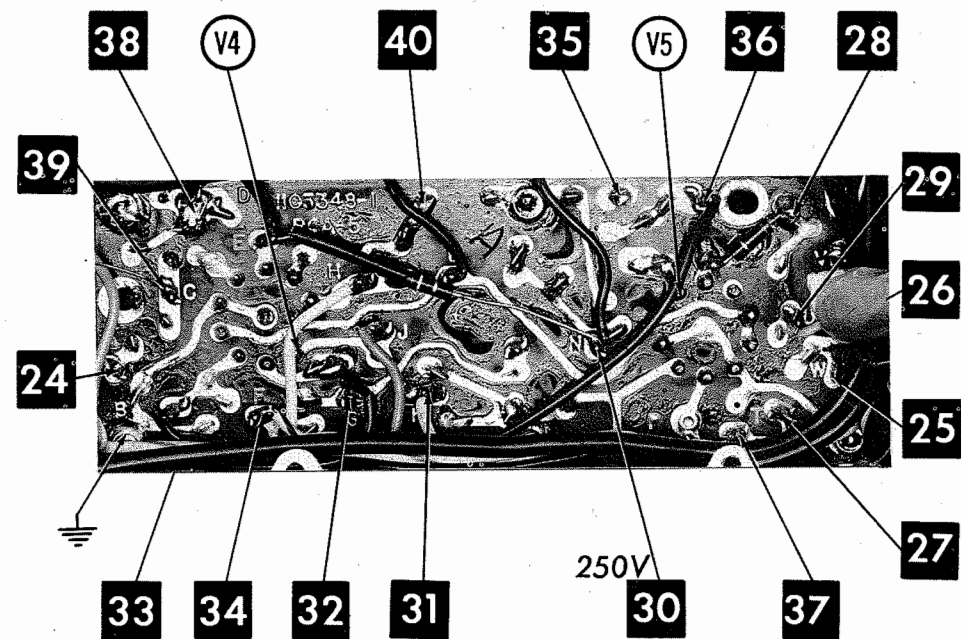
FOLDER 1



A Howard W. Sams CIRCUITRACE® Photo

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

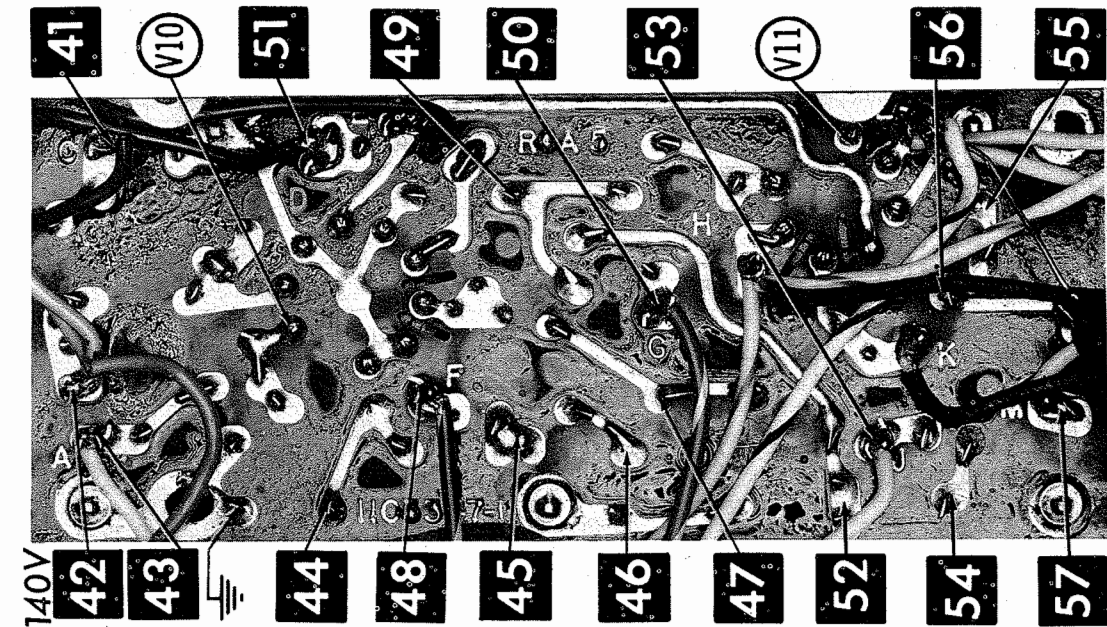
VIDEO IF PRINTED BOARD



A Howard W. Sams CIRCUITRACE® Photo

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

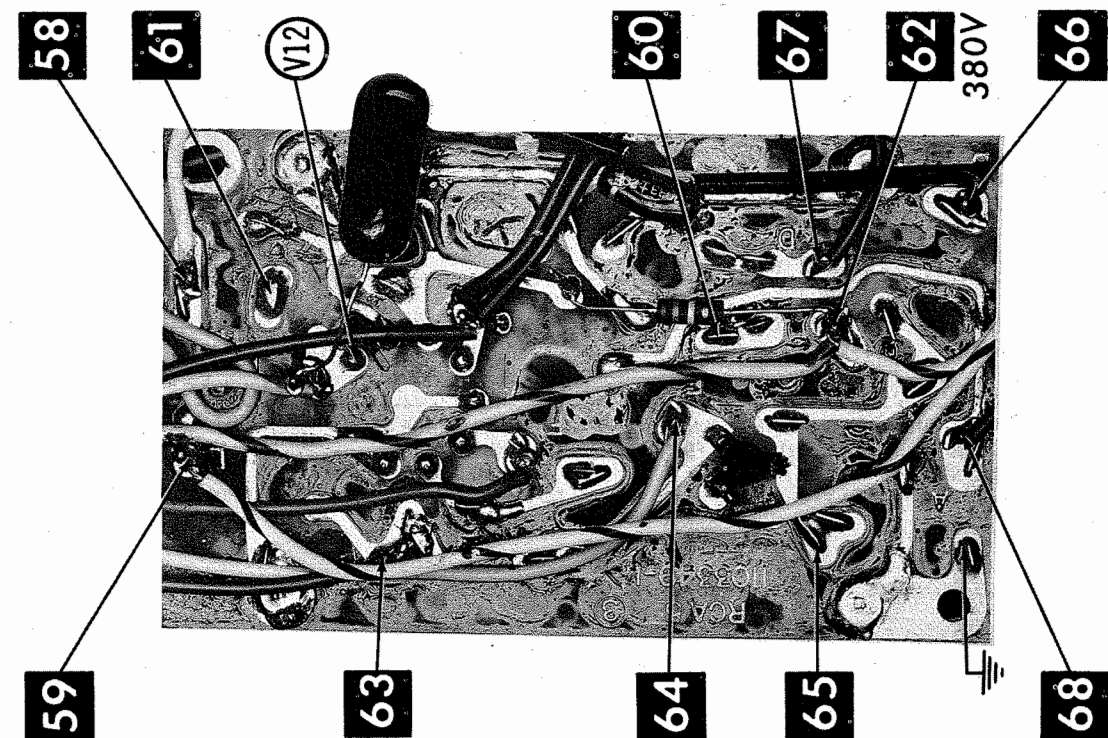
VIDEO, AGC PRINTED BOARD



ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

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VERT. OSC. - OUTPUT PRINTED BOARD



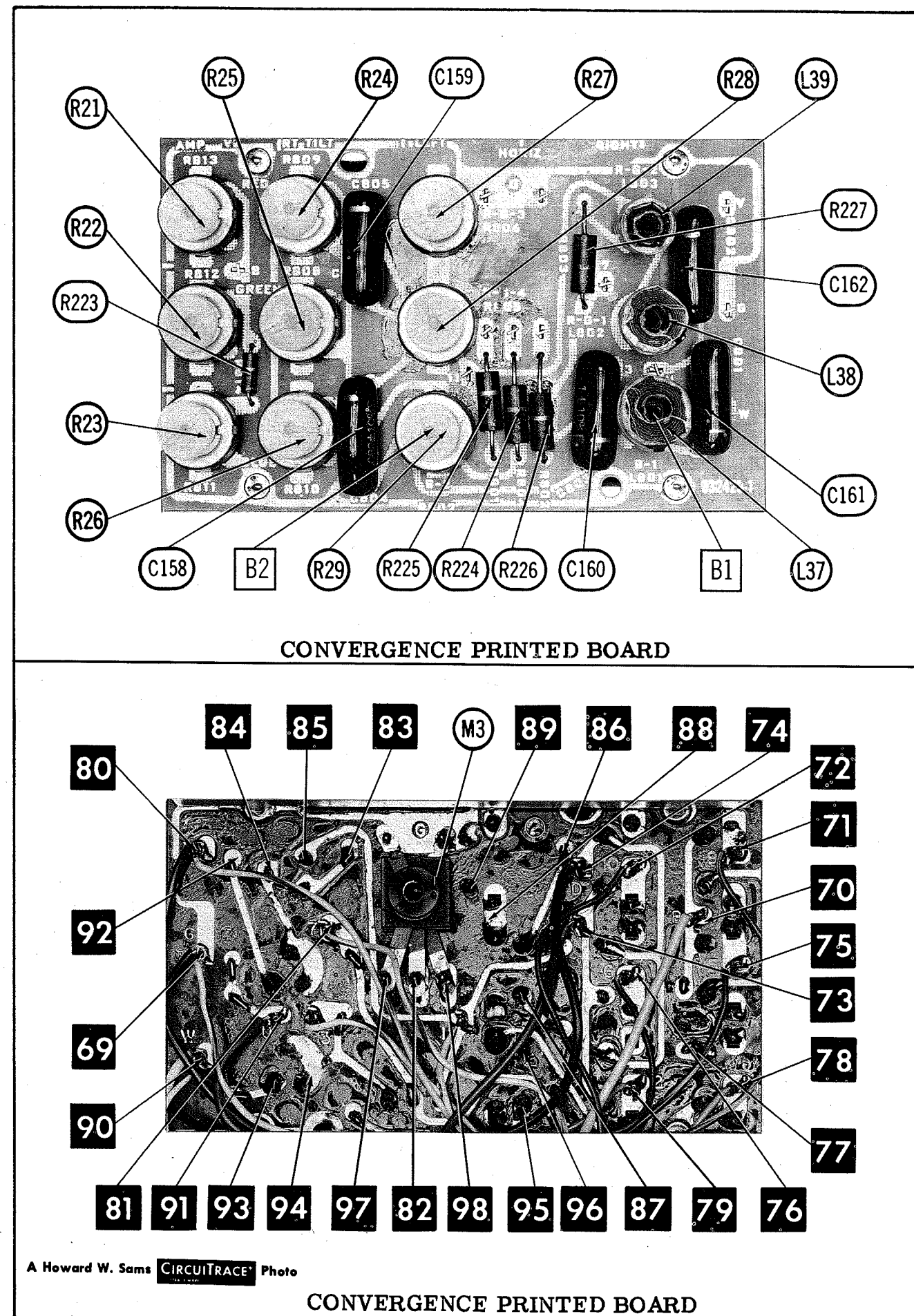
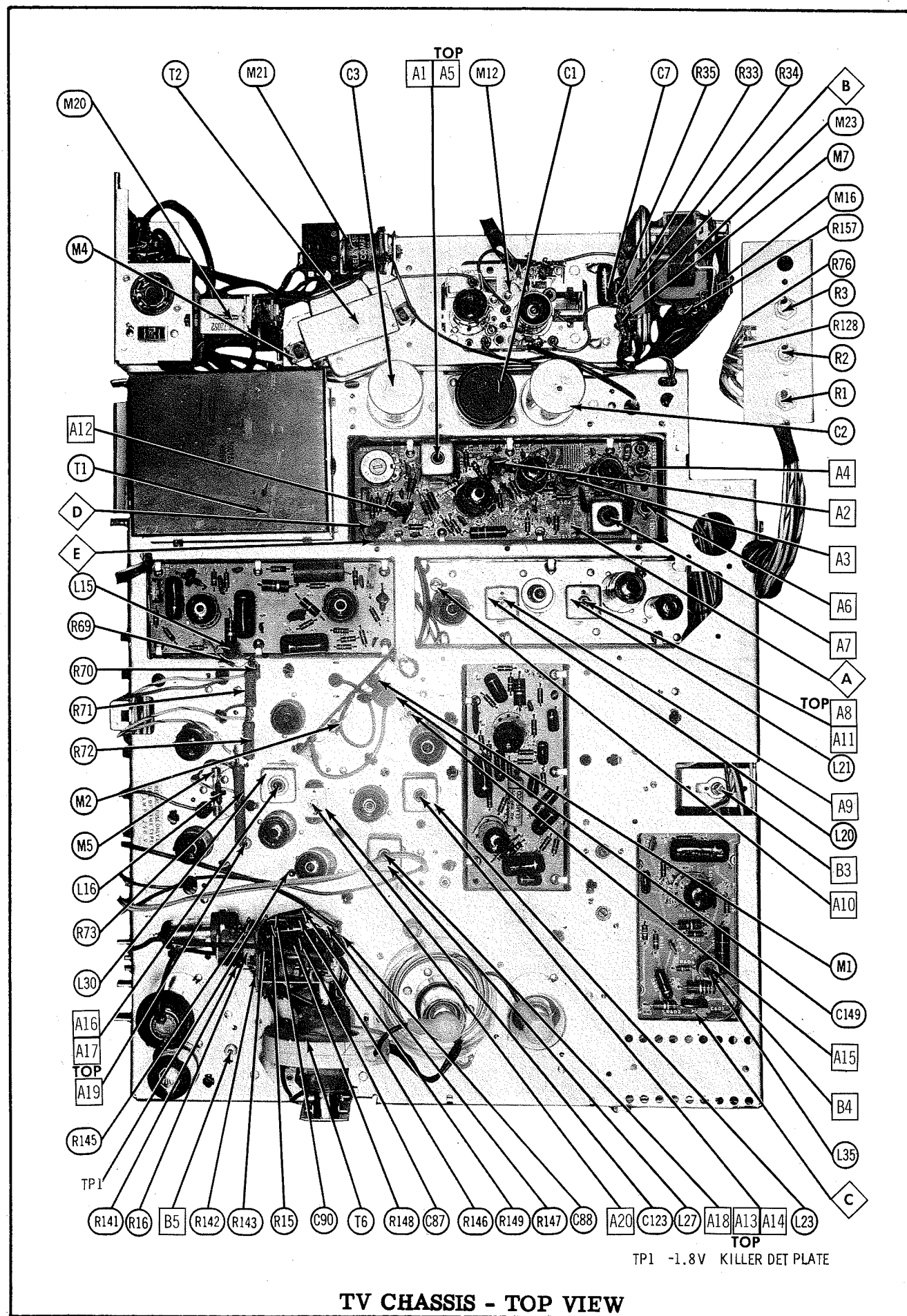
ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

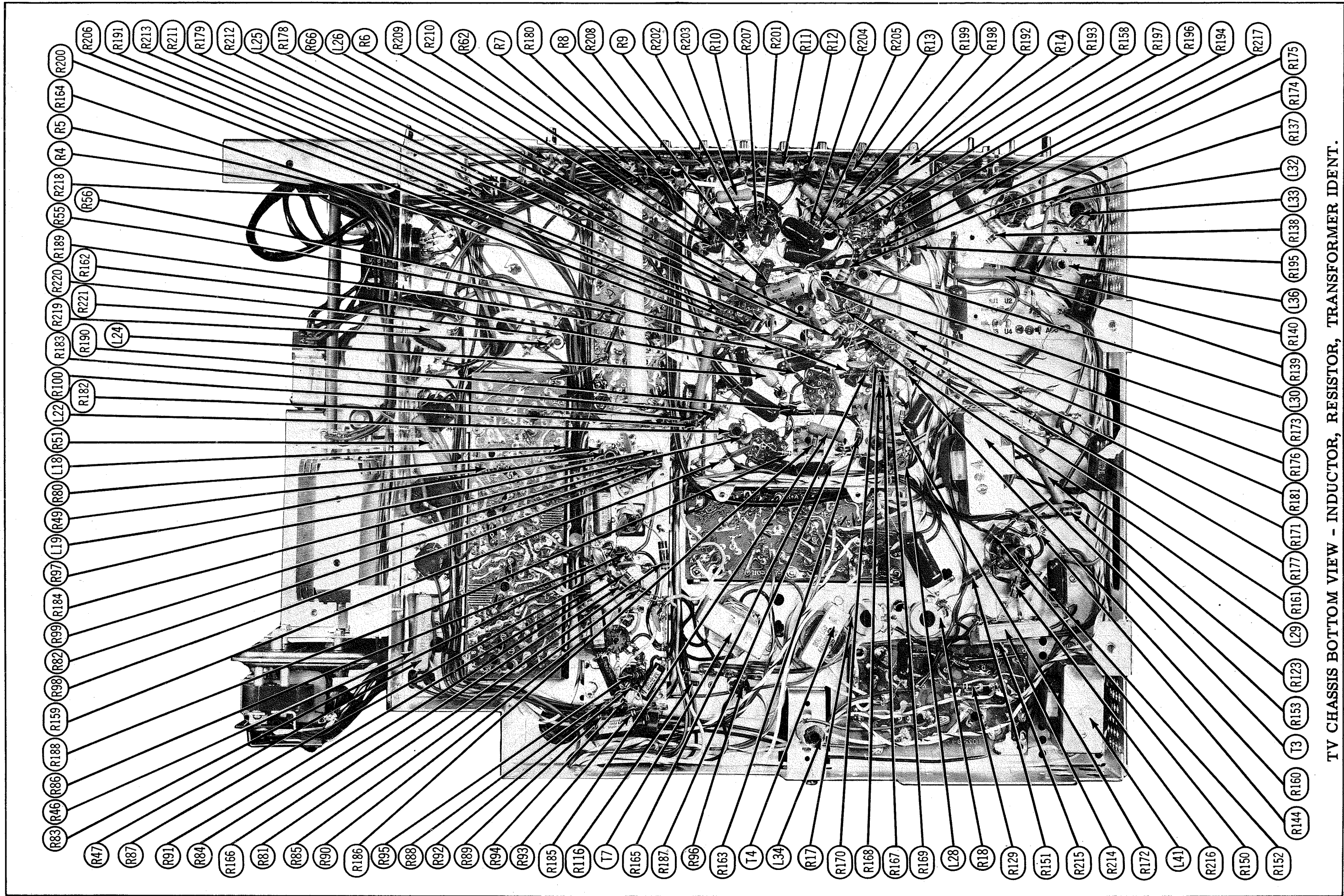
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HORIZ. AFC - OSC. PRINTED BOARD

PACKARD-BELL CHASSIS 98C3, 98C4,
8TUS, DPA-20, RM-301, -400, -401

FOLDER 1





TV CHASSIS BOTTOM VIEW - INDUCTOR, RESISTOR, TRANSFORMER IDENT.

PACKARD-BELL CHASSIS 98C3, 98C4,
8TU5, DPA-20, RM-301, -400, -401

