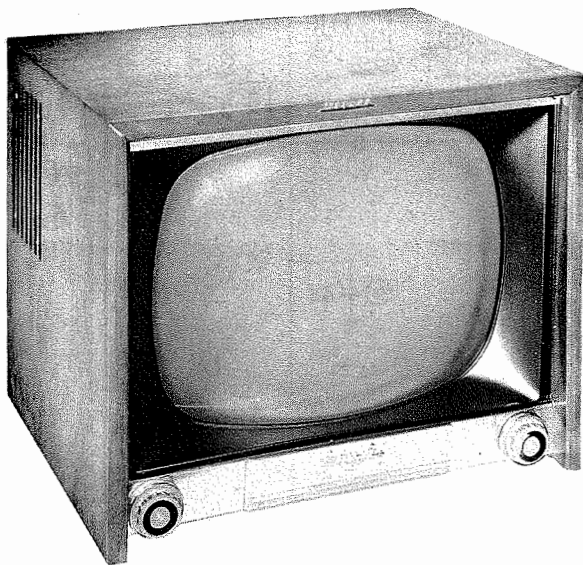




DISASSEMBLY INSTRUCTIONS

- CHASSIS REMOVAL**
- 1. Remove 8 push-on type control knobs from front panel of cabinet.
 - 2. Remove 5 wood screws and 1 metal screw. Remove rear cover.
 - 3. Disconnect speaker plug.
 - 4. Remove 3 chassis bolts. Remove chassis.
 - 5. Remove 4 speaker nuts. Remove speaker.



MODEL	CHASSIS
21DC1, 21DC1-U, 21DC2, 21DC2-U, 21DD1, 21DD1-U, 21DT1, 21DT1-U, 24DC1, 24DC1-U, 24DD1, 24DD1-U, 24DT1, 24DT1-U	98D1

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, through the hole in the cabinet above the channel selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

Remove 3 wood screws holding metal strip at the top edge of the safety glass. Remove metal strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

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

SERVICE ADJUSTMENT LOCATION

See Tube Placement Chart on Page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator may be made from the front panel of the chassis. Adjust the horizontal hold control until the picture synchronizes horizontally. Switch off channel and back again. If picture loses sync, slightly retouch horizontal hold control.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L21) located on top of the chassis.

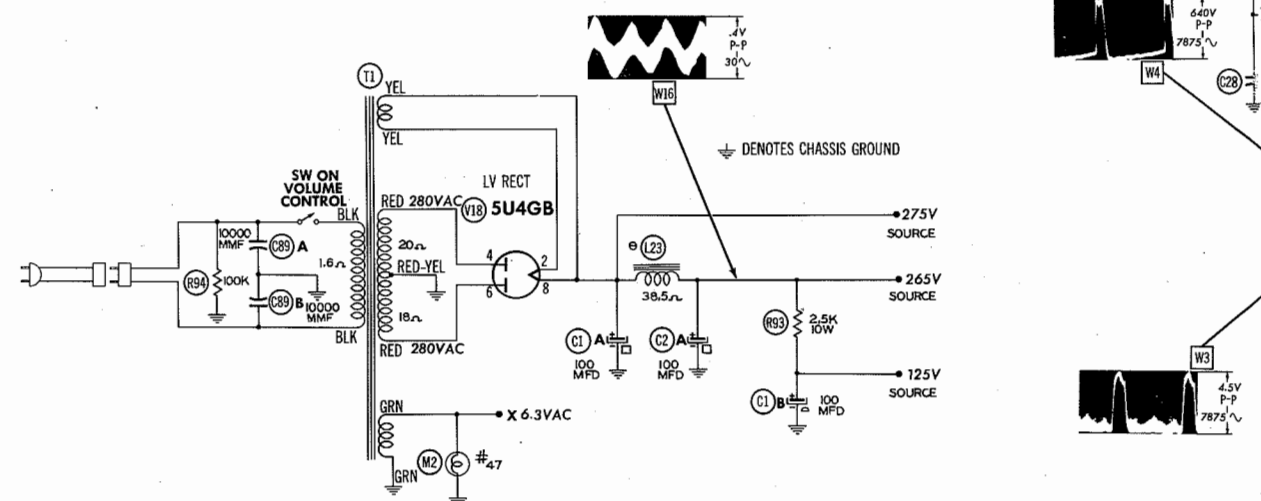
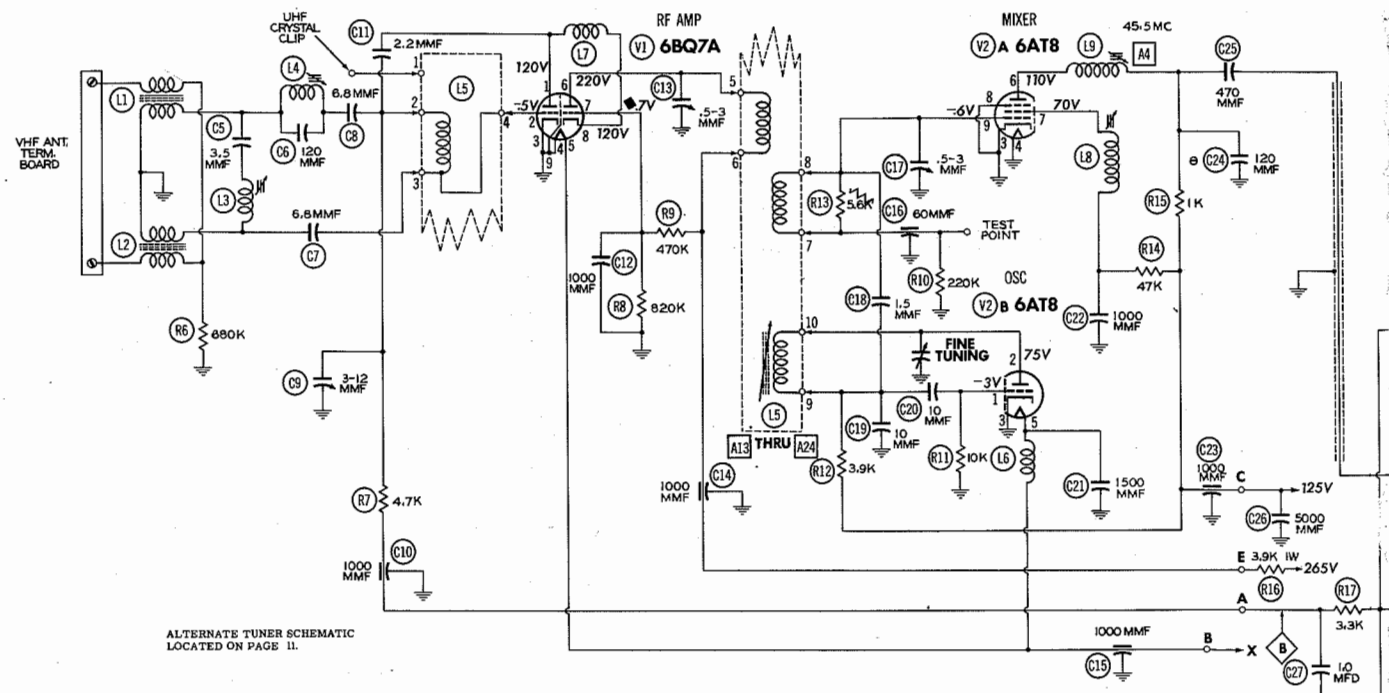
FUSES

One fuse is used for Horiz. Sweep Circuit protection. (For location see Tube Placement Chart).

CENTERING

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

PACKARD-BELL MODELS 21DC1, -U, 21DC2, -U, 21DD1, -U, 21DT1, -U, 24DC1, -U, 24DD1, -U, 24DT1, -U (Ch. 98D1)



◆ MEASURED FROM PIN 8 OF V1.

⊙ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

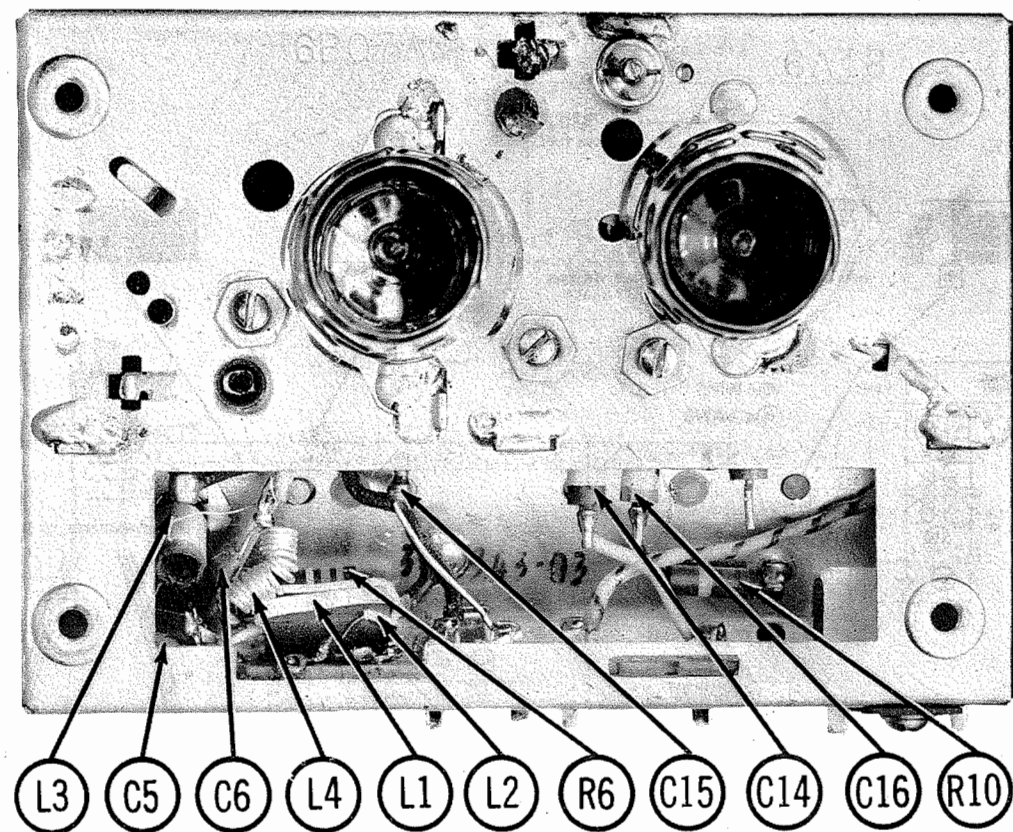
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM. (SEE PARTS LIST)

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

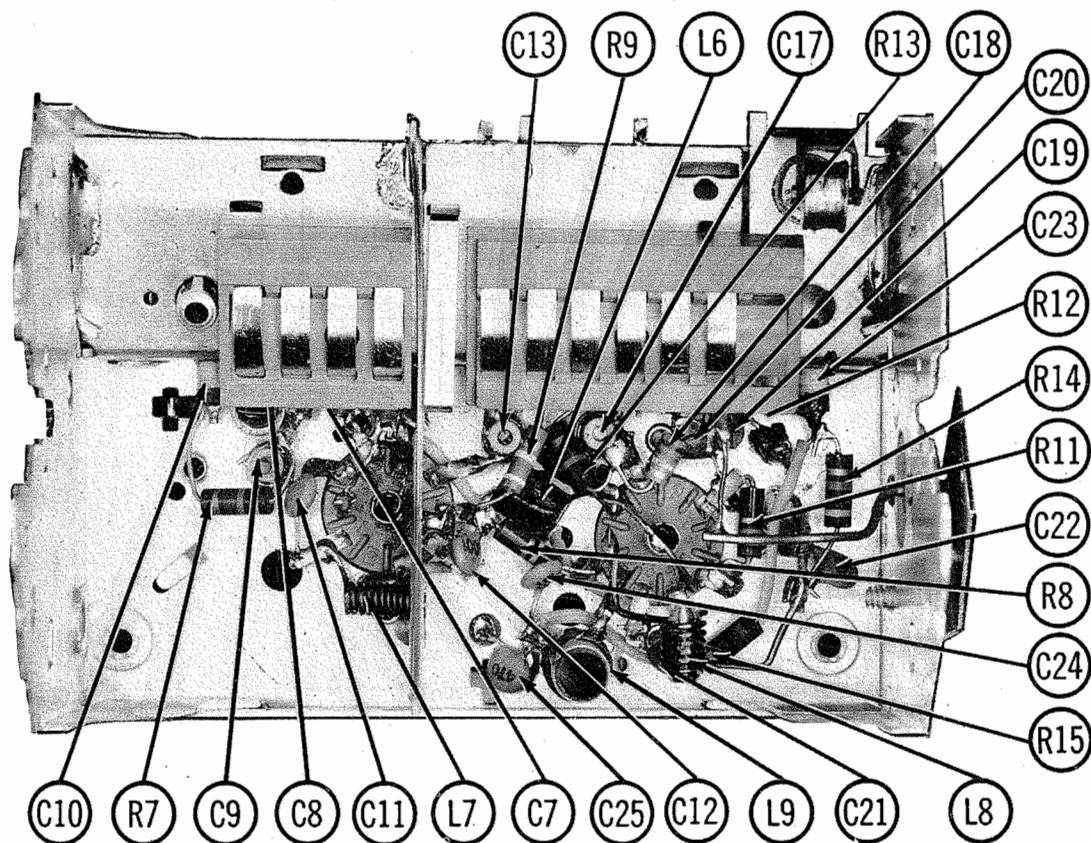
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE

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

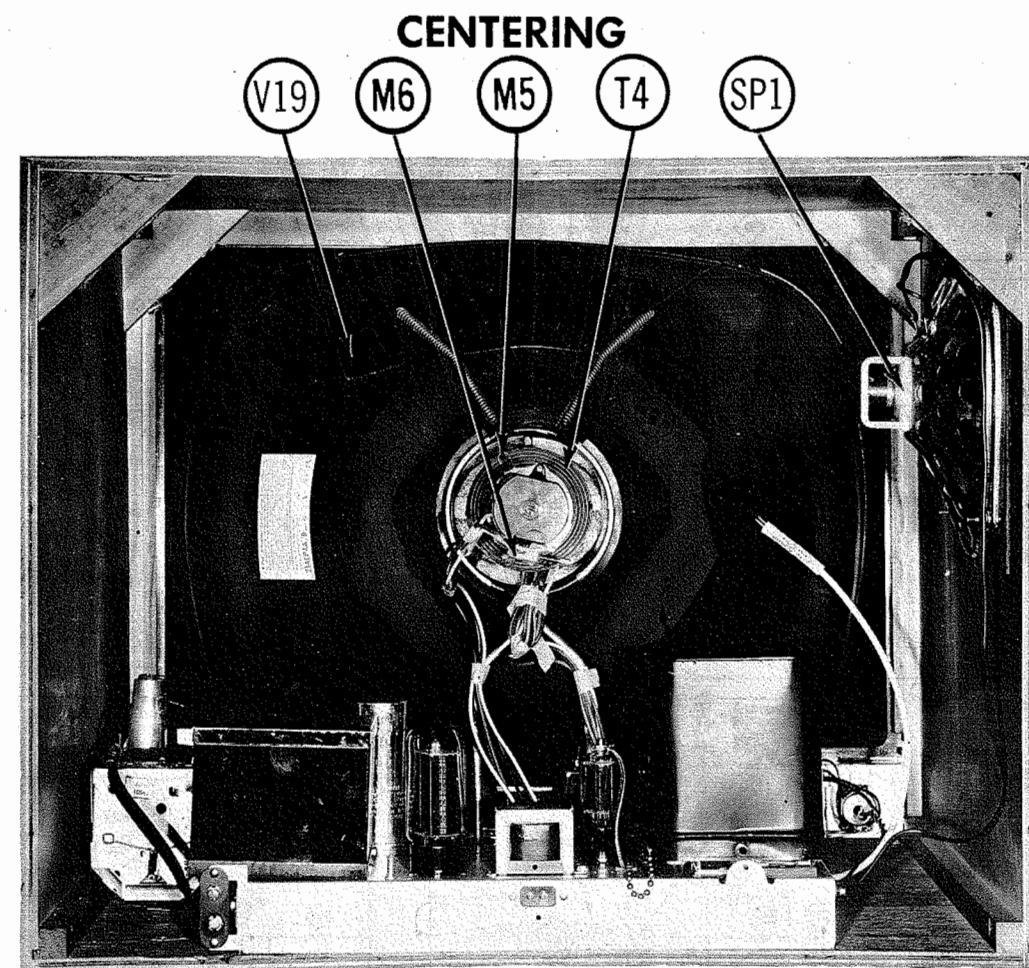
A PHOTOFAC STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1956



RF TUNER-TOP VIEW



RF TUNER-BOTTOM VIEW



CABINET-REAR VIEW

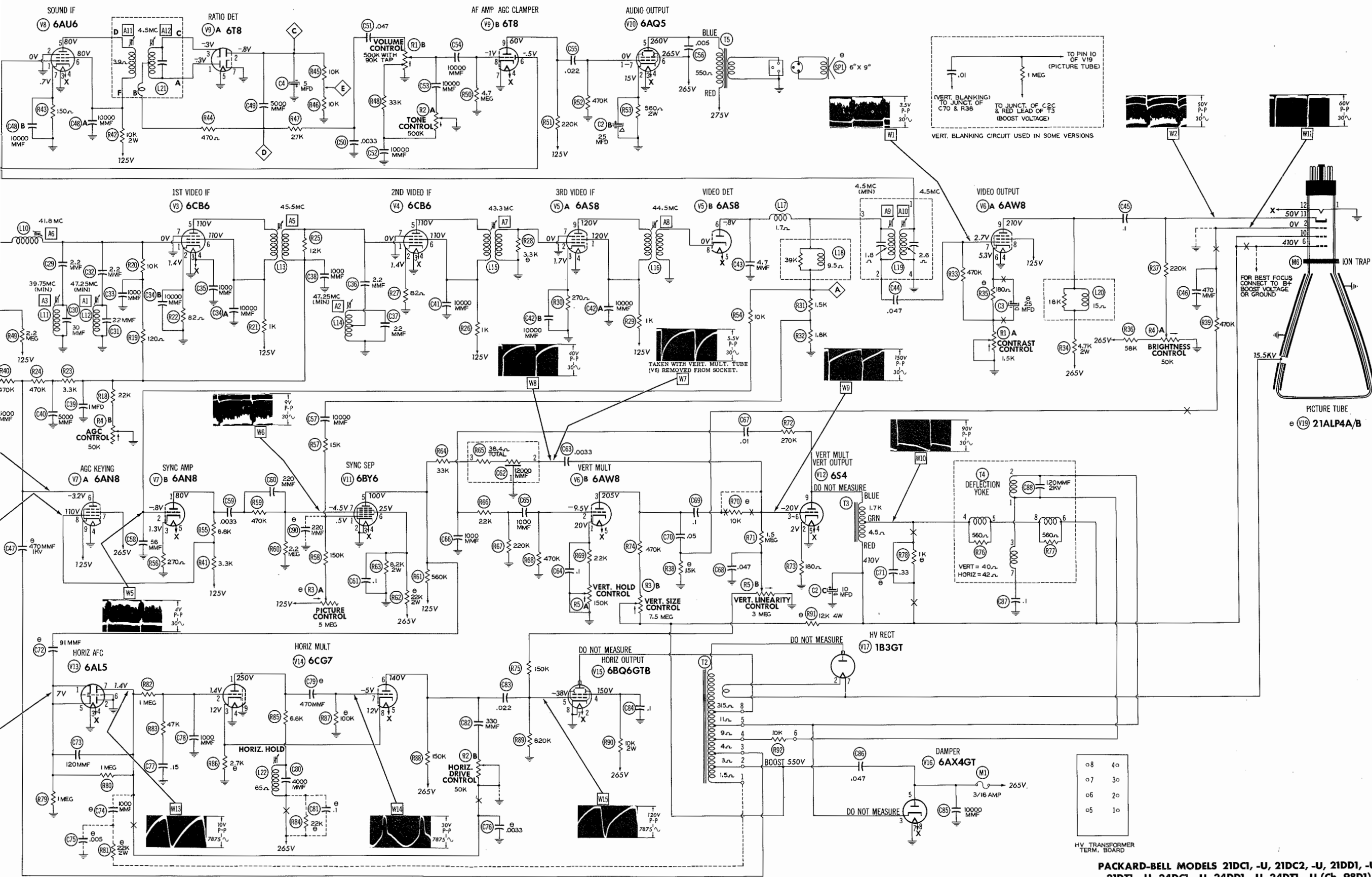
HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

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

Adjust the horizontal hold slug (labeled "Horizontal Hold" on the front panel) until picture synchronizes horizontally. Momentarily remove the signal by switching off channel and back again. If necessary,

SLIGHTLY retouch the horizontal hold slug for best lock-in action.

Adjust the horizontal drive control (R2B) in a clockwise direction as far as possible without the presence of vertical white lines or compression near the center of the picture.



PACKARD-BELL MODELS 21DC1, -U, 21DC2, -U, 21DD1, -U, 21DT1, -U, 24DC1, -U, 24DD1, -U, 24DT1, -U (Ch. 98D1)

PACKARD-BELL MODELS 21DC1, -U, 21DC2, -U, 21DD1, -U, 21DT1, -U, 24DC1, -U, 24DD1, -U, 24DT1, -U (Ch. 98D1)

COILS (cont)

- * Parallel with 18K Ω resistor.
- Use adaptor plate.

REPLACEMENT DATA

L22	65Ω	
-----	-----	--

① Use as alternate.

DE

[illegible]

* Alternate Part No. 10543A.



PACKARD-BELL MODELS 21DC1, -U, 21DC2, -U, 21DD1, -U, 21DT1, -U, 24DC1, -U, 24DD1, -U, 24DT1, -U (Ch. 98D1)

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		Packard-Bell PART No.	STANDARD REPLACEMENT	
V1	RF Amplifier	6BQ7A	6BQ7A	
V2	Mixer-Oscillator	6AT8	6AT8	
V3	1st. Video IF Amplifier	6CB6	6CB6	
V4	2nd. Video IF Amplifier	6CB6	6CB6	
V5	3rd. Video IF Amplifier	6CB6	6CB6	
V6	Video Detector	6AS8	6AS8	
V7	Video Output-Vert. Mult.	6AW8	6AW8	
V8	AGC Keying-Sync Amplifier	6AN8	6AN8	
V9	Sound IF Amplifier	6AU6	6AU6	
V10	Ratio Detector-AF Amp.-AGC Clamper	6T8	6T8	
V11	Audio Output	6AQ5	6AQ5	
V12	Sync Separator	6BY6	6BY6	
V13	Vert. Mult.-Vert. Output	8S4	8S4	
V14	Horiz. AFC	6AL5	6AL5	
V15	Horiz. Mult.	6CC7	6CC7	
V16	Horiz. Output	6BQ6GTB	6BQ6GTB	
V17	Damper	6AX4GT	6AX4GT	
V18	RV Rectifier	1B3GT	1B3GT	
V19	LV Rectifier	5U4GB	5U4GB	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA				NOTES
	Packard-Bell PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	
V19	21ALP4A/B		21ALP4A/B	21ALP4A/B	
	21ALP4A		21ALP4A	21ALP4A	
	21ALP4B		21ALP4B	21ALP4B	
	21ALP4C		21ALP4C	21ALP4C	
	21ALP4D		21ALP4D	21ALP4D	
	21ALP4E		21ALP4E	21ALP4E	
	21ALP4F		21ALP4F	21ALP4F	
	21ALP4G		21ALP4G	21ALP4G	
	21ALP4H		21ALP4H	21ALP4H	
	21ALP4I		21ALP4I	21ALP4I	
	21ALP4J		21ALP4J	21ALP4J	
	21ALP4K		21ALP4K	21ALP4K	
	21ALP4L		21ALP4L	21ALP4L	
	21ALP4M		21ALP4M	21ALP4M	
	21ALP4N		21ALP4N	21ALP4N	
	21ALP4O		21ALP4O	21ALP4O	
	21ALP4P		21ALP4P	21ALP4P	
	21ALP4Q		21ALP4Q	21ALP4Q	
	21ALP4R		21ALP4R	21ALP4R	
	21ALP4S		21ALP4S	21ALP4S	
	21ALP4T		21ALP4T	21ALP4T	
	21ALP4U		21ALP4U	21ALP4U	
	21ALP4V		21ALP4V	21ALP4V	
	21ALP4W		21ALP4W	21ALP4W	
	21ALP4X		21ALP4X	21ALP4X	
	21ALP4Y		21ALP4Y	21ALP4Y	
	21ALP4Z		21ALP4Z	21ALP4Z	

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.	SANGAMO PART No.	SPRAGUE PART No.	
C1A	100	350	24091	AFH2-41		FP227.7	TM-3128	D-175	R2162 *	
C1B	100	350						MTD-3520		
C2A	100	350	24093	AFH3-155-60		FP256	TM-3143	Q-470	R2161 *	
C2B	25	25				TC28				
C3	475	475								
C4	25	25	24006A (Note 1)	PRS25V25	BR252	TC26	TD-25-25	FM-0225	TVA-1205	
	5	5	24038	SRE50V5	BR550	TC30	TD-5-50	MMT-0505	TVA-1303	

Note 1. Used only in chassis stamped with number 821 or higher.
Unit must be ordered from Mfr.

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.	Packard-Bell PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.	
C5	3.5	100								
C6	120	100								
C7	6.8	100								
C8	6.8	100								
C9	10	100								
C10	1000	1000								
C11	2.2	1000								
C12	1000	1000								
C13	5-3	1000								
C14	1000	1000								
C15	1000	1000								
C16	60	100								
C17	5-3	100								
C18	1.5	100								
C19	10	100								
C20	10	100								
C21	1500	1000								
C22	1000	1000								
C23	1000	1000								
C24	120	1000								
C25	470	1000								
C26	5000	1000								
C27	1.0	1000								
C28	5000	1000								
C29	2.2	1000								
C30	30	1000								
C31	22	1000								
C32	2.2	1000								
C33	1000	1000								
C34	10000	10000								
C35	1000	1000								
C36	2.2	1000								
C37	22	1000								
C38	1000	1000								
C39	1.0	1000								
C40	5000	1000								
C41	10000	10000								
C42A	10000	10000								
C43	4.7	1000								
C44	.047	200								
C45	.1	200								
C46	470	1000								
C47	470	1000								
C48A	10000	10000								
C49	10000	10000								
C50	.0033	400								
C51	.047	200								
C52	10000	10000								
C53	10000	10000								
C54	10000	10000								
C55	.022	600								
C56	.005	600								
C57	10000	10000								
C58	50	1000								
C59	.0033	400								
C60	220	1000								

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

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.	SANGAMO PART No.	SPRAGUE PART No.	
C61	.1	200	23107	P288N-1	DF-104	CUB2P1	PT401	2TM-P1	103C12	
C62	12000	12000	123980	1PA-501	1PC-104	CUB2P1	PT401	103C12	103C12	
C63	.0033	400	23052	1464-0033		CUB2P1	PT401	6TM-D33	6TM-D33	
C64	.1	200	23107	P288N-1	DF-104	CUB2P1	PT401	2TM-P1	2TM-P1	
C65	1000	1000	23965	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C66	1000	1000	23965	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C67	.01	600	23138	BD-103	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C68	.047	200	23105	BPD-05	DF-503	CUB2S47	PT4147	2TM-S47	2TM-S47	
C69	.1	600	23145	P688N-1	DF-104	CUB6P1	PT601	6TM-P1	6TM-P1	
C70	.05	600	23051	BPD-05	DF-503	CUB6S5	PT615	6TM-S5	6TM-S5	
C71	.33	200								
C72	.33	200								
C73	120	1000	23963	NP0-DH20	TCZ-120	G044	NP0-333-121	5TCC-T12	5TCC-T12	
C74	1000	1000	23965	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C75	.005	600	23050	1464-005		CUB6D5	GP2-333-502	PT625	6TM-D5	
C76	.0033	400	23050	BPD-0033	D6-332	CUB6D33	GP2-333-332	PT6233	6TM-D33	
C77	.15	200	23108	P288N-15	DD-102	CUB2P15	PT4015	2TM-P15	2TM-P15	
C78	1000	1000	23965	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C79	470	500		1464-00047	D6-471	SR5T47	811-471	MS-347	MS-347	
C80	4000	4000	23208	P288N-1	DF-104	IR5D4	811-471	MS-347	MS-347	
C81	.1	200	23107	1468-00033	D6-331	CUB2P1	811-331	2TM-P1	2TM-P1	
C82	.30	500	23221	BPD-02	DF-203	CUB6S22	811-02	MS-333	MS-333	
C83	.022	600	23141	P688N-1	DF-104	CUB6P1	PT601	6TM-S1	6TM-S1	
C84	.1	600	23145	BPD-01	DD-103	K082	DC-511	5HK-S1	5HK-S1	
C85	10000	10000	23939	BPD-05	DF-503	CUB6S47	PT6147	6TM-S47	6TM-S47	
C86	.047	600	23143	BPD-05	DF-503	CUB6P1	PT601	6TM-P1	6TM-P1	
C87	.1	600	23145	P688N-1	DD-103	CUB6P1	PT601	6TM-P1	6TM-P1	
C88	120	2000	23975	BPD-2X01	DD-103	DK082	811-01	20GA-T12	20GA-T12	
C89A	10000	10000	23982A	BPD-2X01	DD-103	DK082	811-01	5HK-2S1	5HK-2S1	
C90	220	220		SI220	D6-221	TP39	811-221	UC-5322	5GA-T22	

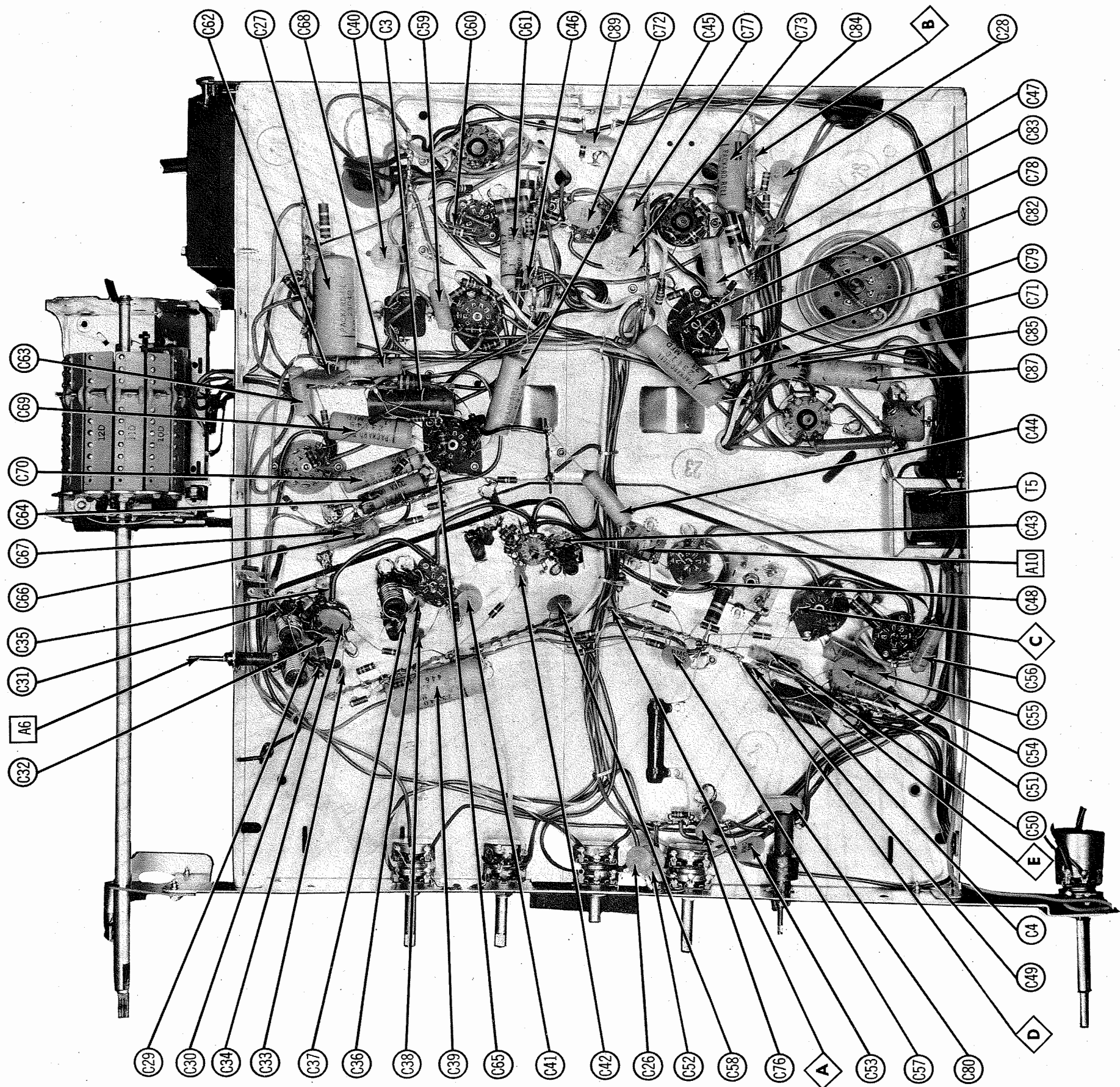
† Items C62 and R65 are combined in one unit.
Note 2. Item C24 is a 68MMF unit in tuner 10543A.
Note 3. Late production sets use integrator 23818 in this application and item C63 was deleted from circuit.
Note 4. Item C63 was changed from standard tolerance to a $\pm 10\%$ unit.
Note 5. In early production models item C72 was 68MMF (NP0-5%).
Note 6. Deleted from circuit in late production models.
Note 7. Added in late production models.
Note 8. Early versions use a 330MMF unit (part #23221) in this application.
Note 9. Not used in some versions.
Note 10. Late versions may use a 56MMF 4KV unit in this application.

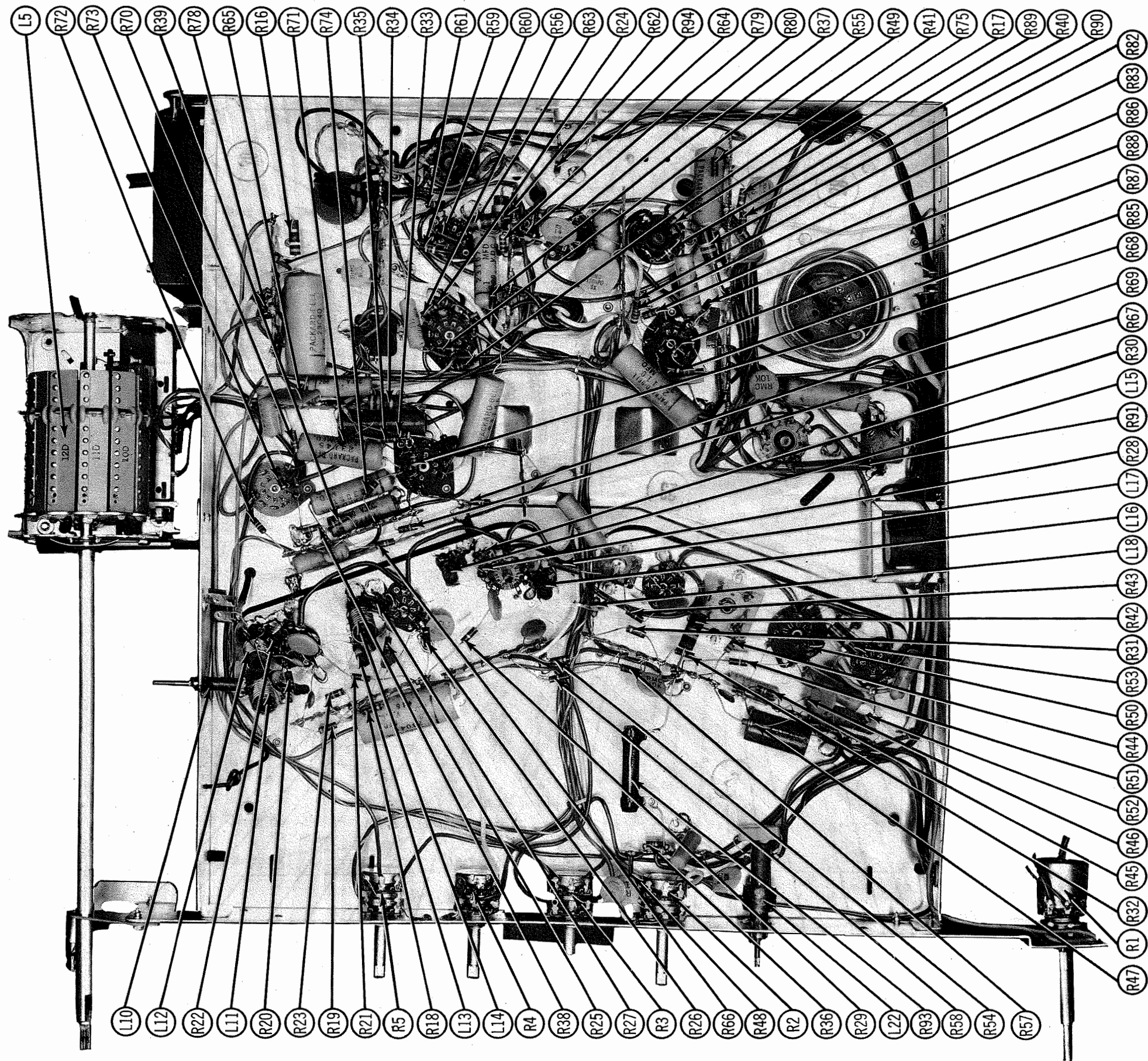
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Packard-Bell PART No.	CORNELL-DUBILIER PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1500K		25888	F1-7		UF152R	UF152R	Contrast (Panel)
B	500K			R2-47		UR55-T54	UR55-T54	Volume tapped at 90K Ω (Rear)
C	Switch			KB-1		US-26	US-26	Attach to RIB.
D	Cover			KB-5				Attach to RIB.
R2A	500K		25889	F1-40		UE1424	UE1424	Tone (Panel)
B	50K			R2-29		UE3300	UE3300	Horiz. Drive (Rear)
R3A	5Meg		25883	F1-20		UF54L	UF54L	Picture - Note 1 (Panel)
B	7.5Meg			R2-29		UR54L	UR54L	Vert. Size (Rear)
R4A	50K		25884	F1-32		UE1251	UE1251	Brightness (Panel)
B	50K			R2-78				AGC (Rear)
R5A	150K		25882					Vert. Hold (Panel)
B	3Meg							Vert. Linearity (Rear)

Note 1. Some versions will use an alternate control Part No. 25883A in this application.
* Concentrik Equivalent: K-2 Kit, Base Elements and Shafts; B11-133 & P9-112 (Panel)
B11-123 & R15-028 (Rear)
B11-141 & P11-024 (Panel)
B11-142 & R15-017 (Rear)
* Concentrik Equivalent: K-2 Kit, Base Elements and Shafts; B11-123 & P9-

PACKARD-BELL MODELS 21DC1, -U, 21DC2, -U, 21DD1, -U,
21DT1, -U, 24DC1, -U, 24DD1, -U, 24DT1, -U (Ch. 98D1)
NOTIFICATION IDENTIFICATION



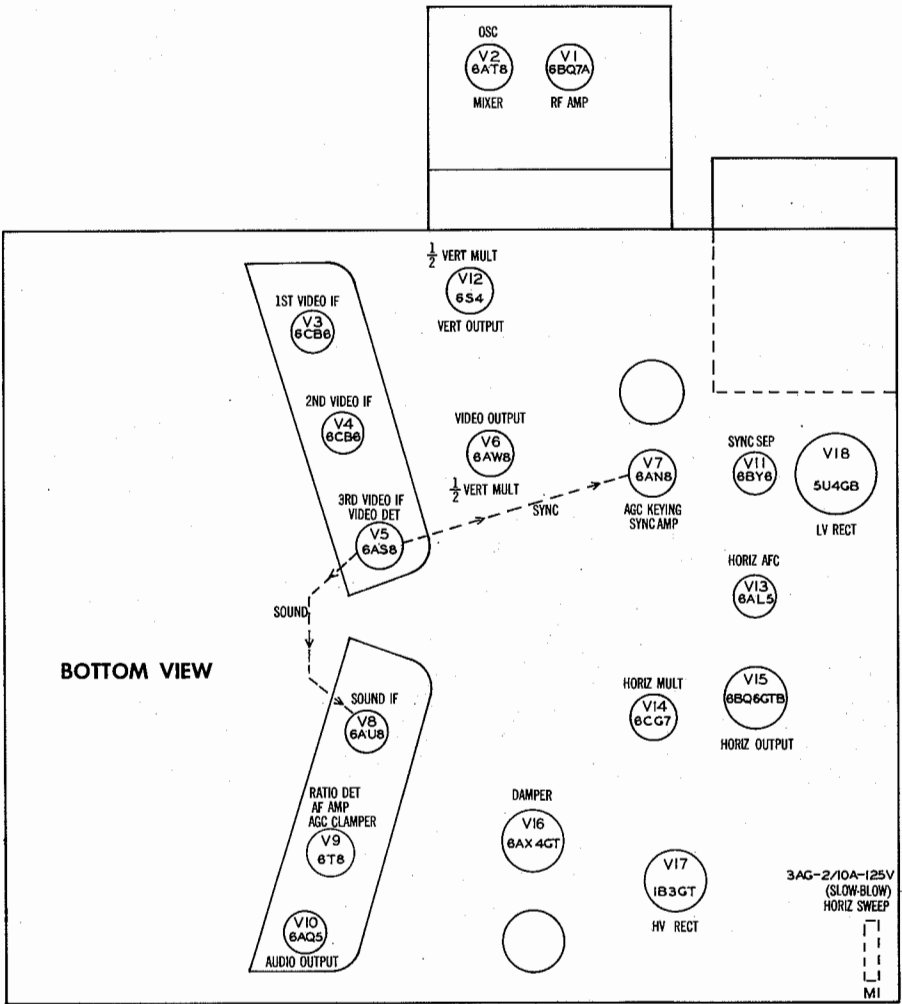


PACKARD-BELL MODELS 21DC1, -U, 21DC2, -U, 21DD1, -U,
21DT1, -U, 24DC1, -U, 24DD1, -U, 24DT1, -U (Ch. 98D1)
NOTIFICATION OF REVISIONS AND MODIFICATIONS

RESISTANCE MEASUREMENTS

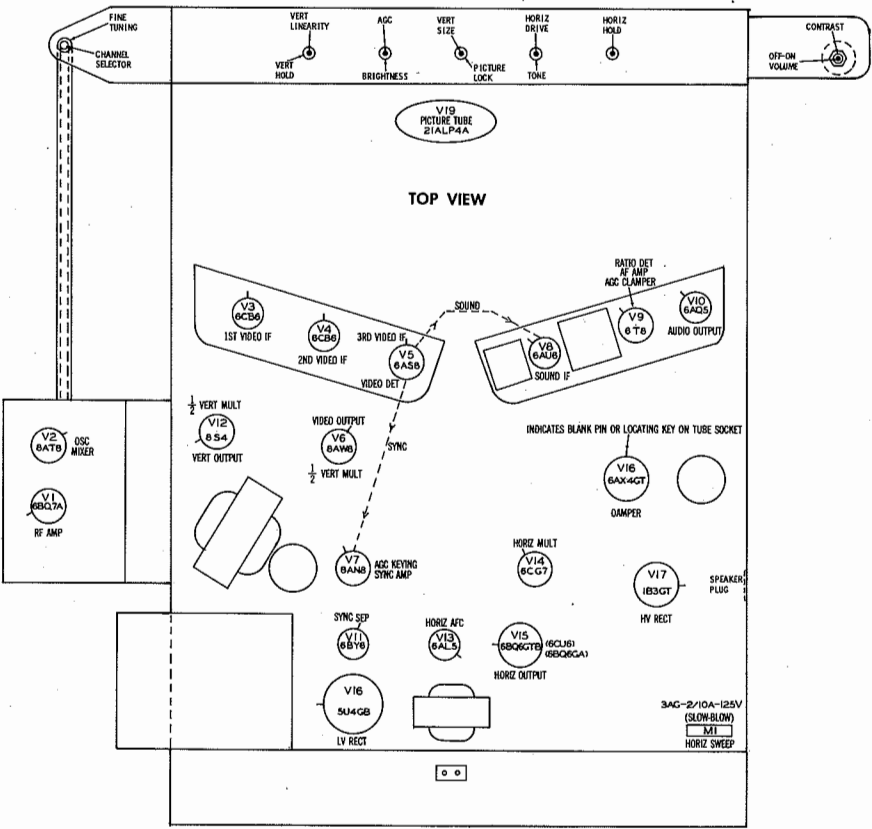
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7A	INF	650KΩ	0Ω	0Ω	.1Ω	† 3.9KΩ	300KΩ	INF	0Ω
V 2	6AT8	10KΩ	† 6.5KΩ	0Ω	0Ω	.1Ω	† 3.5KΩ	† 50KΩ	0Ω	220KΩ
V 3	6CB6	70KΩ	82Ω	0Ω	.1Ω	† 3.5KΩ	† 3.5KΩ	0Ω		
V 4	6CB6	60KΩ	82Ω	0Ω	.1Ω	† 3.5KΩ	† 3.5KΩ	0Ω		
V 5	6AS8	† 3.5KΩ	.1Ω	270Ω	0Ω	.1Ω	3.3KΩ	0Ω	.1Ω	† 3.5KΩ
V 6	6AW8	80KΩ	470KΩ	▲ 1.7Meg	0Ω	.1Ω	400Ω	470KΩ	† 2.5KΩ	† 4.7KΩ
V 7	6AN8	† 13KΩ	13KΩ	270Ω	0Ω	.1Ω	400KΩ	† 39Ω	† 5.8KΩ	† 2.5KΩ
V 8	6AU6	2.6Ω	0Ω	0Ω	.1Ω	† 13KΩ	† 13KΩ	150Ω		
V 9	6T8	INF	20KΩ	INF	.1Ω	0Ω	650KΩ	0Ω	4.7Meg	† 220KΩ
V 10	6AQ5	470KΩ	560Ω	0Ω	.1Ω	† 550Ω	† 39Ω	470KΩ		
V 11	6BY6	130KΩ	0Ω	0Ω	.1Ω	† 560KΩ	† 17KΩ	2.2Meg		
V 12	6S4	NC	180Ω	2.2Meg	.1Ω	0Ω	2.2Meg	NC	NC	▲ 14KΩ
V 13	6AL5	1Meg	0Ω	0Ω	.1Ω	1Meg	0Ω	2Meg		
V 14	6CG7	† 6.8KΩ	3Meg	2.7KΩ	0Ω	.1Ω	† 150KΩ	100KΩ	2.7KΩ	0Ω
V 15	6BQ6GTB	NC	.1Ω	TP	† 10KΩ	600KΩ	NC	0Ω	0Ω	TOP CAP ▲ 11Ω
V 16	6AX4GT	TP	NC	350KΩ	TP	† 39Ω	TP	0Ω	.1Ω	
V 17	1B3GT		PINS 1-8	HAVE	INF	RESISTANCE				TOP CAP ▲ 326Ω
V 18	5U4GB	NC	20KΩ	NC	20Ω	NC	18Ω	NC	20KΩ	
V 19	21ALP4A	0Ω	500KΩ	PIN 6 ▲ 12KΩ	PIN 10 ▲ 12KΩ	PIN 11 † 220KΩ	PIN 12 .1Ω			

† MEASURED FROM PIN 8 OF V18.
▲ MEASURED FROM PIN 3 OF V16.
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 - V18

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V7, V19
Has pic, no sound - V8, V9, V10
Overloaded picture - V7, V9

SYNC FAILURE
No vert. sync - V6, V11, V12
No horiz. sync - V11, V13, V14
No vert. or horiz. sync - V7, V11

SWEEP FAILURE
No raster, has sound - V14, V15, V16, V17, V19, Fuse (M1)
No vertical deflection - V6, V12
Poor vert. linearity or foldover - V6, V12
Poor horiz. linearity or foldover - V14, V15, V16
Narrow picture - V14, V15, V16, V17, V18
Vert. off freq. - V6, V11, V12
Horiz. off freq. - V11, V13, V14

PACKARD-BELL MODELS 21DC1, -U, 21DC2, -U, 21DD1, -U, 21DT1, -U, 24DC1, -U, 24DD1, -U, 24DT1, -U (Ch. 98D1)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT
The high voltage lead should be securely taped and kept away from chassis. Do not remove the horizontal multivibrator tube (V14) to disable the high voltage.

VIDEO IF ALIGNMENT

Connect the negative lead of a 3 volt battery to the ungrounded side of C28. Connect the positive lead to chassis.

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1. Direct	High side to an ungrounded tube shield floating over osc. - mixer tube. Low side to chassis.	47.25MC (Unmod.)	Between any two channel	DC probe to point A. Common to chassis.	A1, A2	Increase signal generator output for useable reading on VTVM. Adjust for MINIMUM deflection on VTVM.
2. "	"	39.75MC	"	"	A3	"
3. "	"	45.5MC	"	"	A4, A5	Attenuate signal generator output for approximately 3 volts on VTVM. Adjust for maximum deflection.
4. "	"	41.8MC	"	"	A6	"
5. "	"	43.3MC	"	"	A7	"
6. "	"	44.5MC	"	"	A8	"

OVERALL VIDEO IF RESPONSE CHECK

Couple a signal generator to an ungrounded tube shield floating over converter tube to provide markers on the response curve. Connect a .1MF/100 volt capacitor from point A to chassis. Set AGC switch in normal position. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7. Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	43MC (10MC Swp.)	39.75MC 41.25MC 43.3MC 45.0MC 45.75MC 47.25MC	3	Vert. Amp. thru 22KΩ to point A. Low side to chassis.		Check for response curve similar to Fig. 1. The 39.75MC and 47.25MC markers should be at MINIMUM response. To view these markers use high scope gain and increase sweep generator output. The 45.0MC marker should not exceed 97% and the 41.25MC marker should not exceed 12%. If necessary, slightly retouch A4 thru A8 for desired response.

4.5MC TRAP ALIGNMENT

Turn the contrast control fully clockwise.

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
8. .001MFD	High side to point A. Low side to chassis.	4.5MC (Unmod.)	Any non-interfering channel	DC probe thru detector (Fig. 2) to pin 11 (cathode) of picture tube. Common to chassis.	A9	Adjust for MINIMUM deflection.

ALTERNATE 4.5MC TRAP ALIGNMENT

Restore the set to normal operating condition and tune in a local TV station. Adjust A9 for MINIMUM 4.5MC beat in picture.

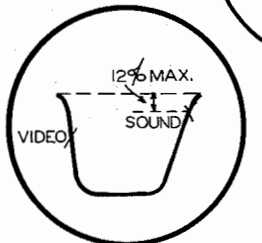
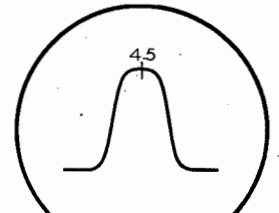
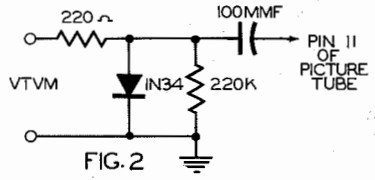
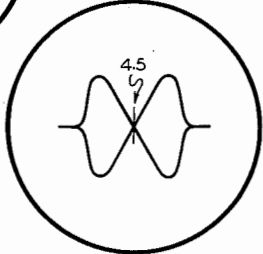
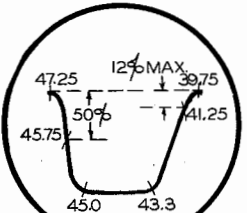
SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9. .001MFD	High side to point A. Low side to chassis.	4.5MC (Unmod.)	Any non-interfering channel	DC probe to point A. Common to chassis.	A10, A11	Adjust for maximum deflection.
10. "	"	"	"	DC probe to point A. Common to point A.	A12	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

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
9. .001MFD	High side to point A. Low side to chassis.	4.5MC (450KC Swp.)	4.5MC	Any non-interfering channel	Vert. Amp. to point A. Low side to chassis.	A10, A11	Disconnect stabilizing capacitor C4. Adjust for curve of maximum amplitude and symmetry similar to Fig. 3.
10. "	"	"	"	"	Vert. Amp. to point A. Low side to chassis.	A12	Reconnect C4. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 4. Slightly retouch A11 for maximum amplitude and straightness of crossover lines.



ALIGNMENT INSTRUCTIONS (cont)

VHF OSCILLATOR ALIGNMENT

The channel oscillator screws are reached thru a hole just above the fine tuning shaft. The correct VHF oscillator adjustment screw is accessible thru 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 50Ω. Set the fine tuning control to the mid-position of its range.

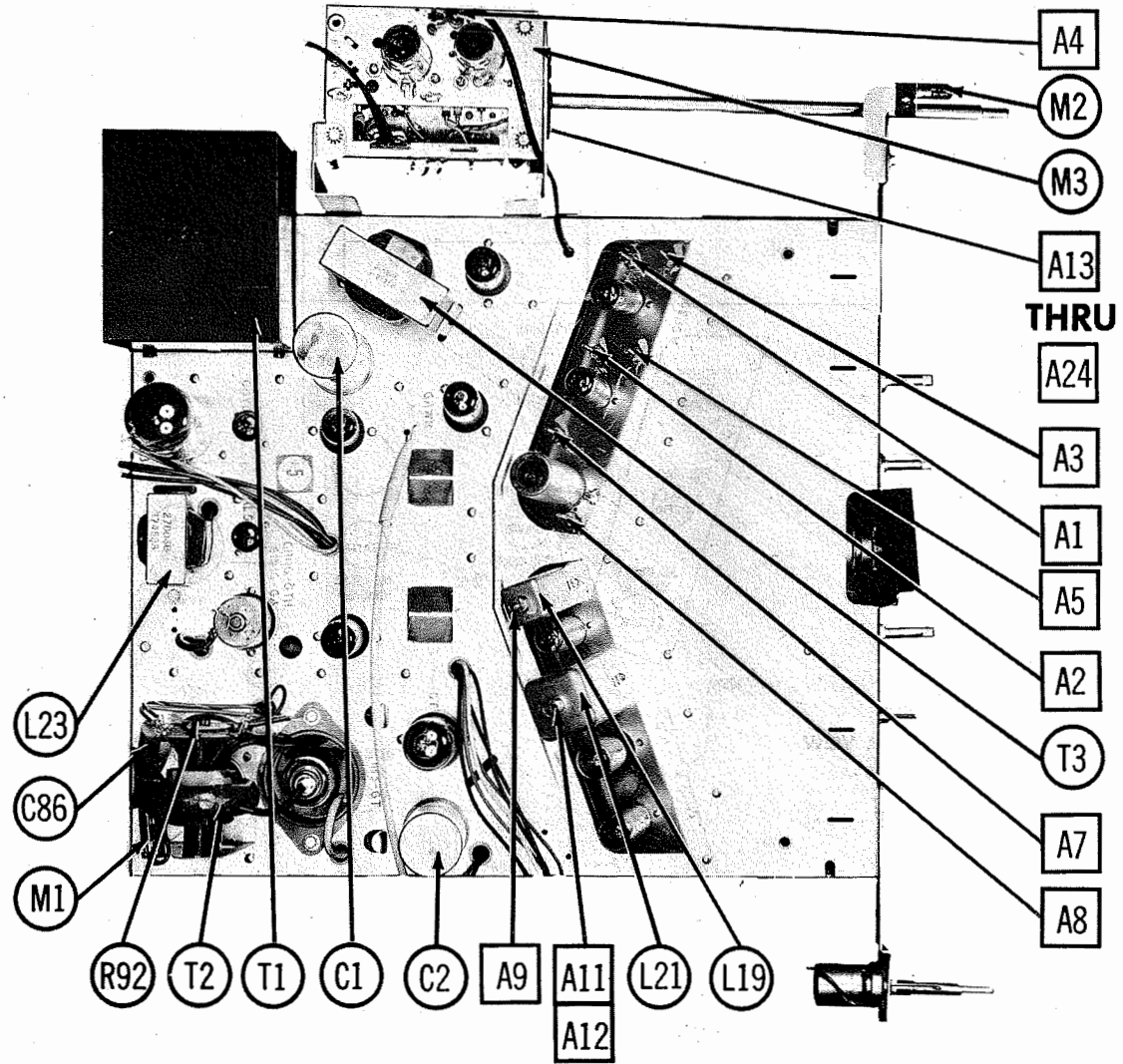
DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11. Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp.) 207MC (10MC Swp.) 201MC (10MC Swp.) 195MC (10MC Swp.) 189MC (10MC Swp.) 183MC (10MC Swp.) 177MC (10MC Swp.) 85MC (10MC Swp.) 79MC (10MC Swp.) 69MC (10MC Swp.) 63MC (10MC Swp.) 57MC (10MC Swp.)	211.25MC 215.75MC 205.25MC 209.75MC 199.25MC 203.75MC 193.25MC 197.75MC 187.25MC 191.75MC 181.25MC 185.75MC 175.25MC 179.75MC 83.25MC 87.75MC 77.25MC 81.75MC 67.25MC 71.75MC 61.25MC 65.75MC 55.25MC 59.75MC	13 12 11 10 9 8 7 6 5 4 3 2	Vert. Amp. thru 22KΩ to point A. Low side to chassis.	A13 A14 A15 A16 A17 A18 A19 A20 A21 A22 A23 A24	Adjust to place video marker at 50% on response curve as in Fig. 5. Sound markers should not exceed 12%.

VHF RF AND MIXER ALIGNMENT

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

UHF TUNER ALIGNMENT

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



CHASSIS TOP VIEW

PACKARD-BELL MODELS 21DC1, -U, 21DC2, -U, 21DD1, -U, 21DT1, -U, 24DC1, -U, 24DD1, -U, 24DT1, -U (Ch. 98D1)